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Portable Roundup

PC Disk Sentry, Stops Trojan Horse Programs

A Guide to Portable & Laptop Computers

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ATARI

Applying The Atari

by Jeff Brenner

This month we'll begin entering another major program—a program that writes checks for you on continuous check forms. We will also examine a number to English subroutine and read some reader mail and newsletters.

Reader Mail

Dear Jeff,

A few weeks ago I received an Atari 600XL as a gift (no books or manuals with it), and even though I use a computer at work, I know little about this computer stuff so I have some questions for you: (1) Where can I find a manual for this computer? (2) How can I know how much RAM memory I have on it? (3) If I have, let's say 16K, where can I find something to extend it to 48K or 64K memory?

Luis E. Cazares
Eagle Pass, Texas

(1) *The Atari XL User's Handbook* ($15.95, published by Weber Systems, 8437 Mayfield Rd., Cleveland, OH 44026) is a fine book on the 600XL and 800XL which I have reviewed and recommended in the past. The book includes everything covered by Atari's original manual and many more topics. Weber Systems also publishes the *Atari XE User's Handbook* for the newer 65XE and 130XE computers. (2) To determine the RAM in your computer, type:

```
PRINT PEEK(106)
```

If the computer responds with a 64, then you have a 16K computer. If the response is a 160, then you have a 48K (on a 400/800), 64K (on 600XL/800XL) or 128K (on an 130XE). On the 600XL, unless the memory expansion unit is installed, I doubt that you have more than 16K. (3) Many have had difficulty finding the 64K upgrade for the 600XL. American TV (15338 Inverness St., San Leandro, CA 94579) carries the upgrade, along with other hard-to-find 8-bit Atari components. I would highly recommend that any 16K 600XL owner upgrade to 64K, since the vast majority of Atari programs (including those published in this column) require more than 16K RAM.

Dear Jeff,

The programs I have seen in your column have actually encouraged me to buy an Atari 130XE over a competing model. Great job! Being new to the Atari I have two questions for you: Will a printer advertised to work on an 800XL work with my 130XE? Will all 800XL software work with the 130XE?

I. Morgan
Atlanta, Georgia

I am printing your question to address the general problem of compatibility-confusion that has erupted, mostly among newer Atari owners, due to the numerous models of Atari computers floating around. Currently, Atari's line can be divided into two major categories: the 8-bit machines and the ST-machines. Generally, software designed for one group is not compatible with the other. For example, a 5¼" diskette containing an 8-bit utility cannot be loaded into an ST. Some hardware is also compatible with only one group. Among the 8-bit machines, the 1200XL, expanded 600XL, 800XL, and 65XE all have 64K RAM and are compatible with each other and with most software and all hardware designed for the original Atari 400 and 800 machines. (An unexpanded 600XL has only 16K and therefore a more limited number of programs can be used with it.) The 130XE is also fully hardware compatible with the 1200XL, 600XL, 800XL and 65XE. In fact, the 130XE is essentially a 65XE with an extra 64K memory (for a total of 128K), so it can run any software that works with the 65XE or XL machines. 130XE software, however, cannot necessarily be used with the 65XE or XLs since there is a good chance that the program advertised for the 130XE will take advantage of the extra memory found only in the 130XE. (However, a 65XE or XL that has been expanded to 128K or 256K will run most 130XE software).

In answer to your specific question, then: Yes, a printer that works with an 800XL will work with the 130XE. More important, a printer interface that works with the 800XL will work with the 130XE. (The only interface that would not be compatible among all 8-bit Ataris is the older MPP 1100 parallel printer interface for the Atari 800 from Microbits Peripheral Products. This interface required a modification to the computer and had to be plugged into the third joystick port, which does not exist on the XL/XE.) And yes, 800XL software will work on the 130XE, but not necessarily vice versa.

Dear Jeff,

Suggestion: Could you use your column to request that all Atari BBS sysops send new and

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YEMACYB Printer Utility

Reviewed by Jeff Brenner

YEMACYB is a clever printer utility that lets your Epson, Gemini or Prowriter print in color. By printing in four-passes, each time with a different primary color ribbon, YEMACYB gives a full-color hardcopy of the screen image. YEMACYB looks at the color registers when printing, so the colors in the printout are very similar to the colors used in the image on-screen.

Loading Graphics

YEMACYB can load any standard (62-sector) graphics file (such as Micropainter pictures). Once a picture is loaded, the program allows you to add additional colors to the screen by using display list interrupts (DLIs). Unfortunately, the means of doing this through the program is quite tedious and inaccurate, since it involves specifying scan lines at which you want color changes to occur. Since the changed colors are not shown until all DLIs are entered, it is quite difficult to make color changes at the points desired. The DLI color changes would have been much easier to do if the program allowed the use of the joystick for specifying changes while the image remained on-screen.

Printing In Color

Once the DLIs (if any) have been specified, the program performs what the manual terms "color analysis" and checks to see the minimum number of ribbons that will be needed to print the picture. For example, a picture that uses only the colors red, blue, violet, and dark blue would not need a yellow ribbon for printing and could be printed in only three passes (red, blue and black). Most pictures, however, will require all four ribbons.

To print, you specify the ribbon color that you want to begin printing with (yellow is recommended as the first color to print). A registration mark is printed on one page, followed by the first color. After the first color is printed, you turn the printer off, roll the paper back to the registration mark, and change the ribbon in your printer to the next color. The registration mark is used to assure that subsequent printing passes (using the other color ribbons) are precisely overlaying the previous colors.

Utilities

Included on the YEMACYB diskette are several utilities. YFLIPPER.BAS takes a MicroPainter picture and "mirror flips it;" YSAVUSCR.BAS captures a GRAPHICS 7 image created by a BASIC program; YDLISCON.BAS converts the menu color changes to DOS format. YBAREBON.BAS is a graphics 7 editor that includes a text entry mode; YPALLETT.BAS contains the ribbon-color definitions for each hue on the Atari and allows you to change the color definitions if desired to make them more accurately reflect your screen's colors; YWINDOWS.BAS allows cut and paste manipulation of graphics and merging.

Documentation

The 20-page manual is well-written and easy to understand. A lack of detailed instructions for the various utilities (only a description is provided) is the manaul's only serious fault.

Conclusions

YEMACYB successfully turns your black and white printer into a full color printer. The printouts, when made with high quality ribbons, are more consistent in appearance than those printed by an Okimate, but the colors are not as bright, nor as well defined in many cases.

The four pass process is a tedious and time-consuming one. Multicolor printing on a printer designed for monochrome use does not come easy. If your printer has a spool-type ribbon (such as the Gemini) getting a color printout might be more trouble than its worth. The task of replacing a single spool-type ribbon is bad enough; imagine respooling four times to get one picture. The job is much smoother with a cartridge ribbon, but you still need four-passes, and must take time to line up the registration mark with each pass.

For those who would occasionally like to print multicolored graphics, YEMACYB will be an appreciated utility. It won't be appreciated, however, if you want to print in color every day, or if you've got seven or eight consecutive pictures to print. In these cases, buying a cheap color printer such as the Okimate would be my recommendation.

Requires: 8-Bit Atari Computer, 40K min.
Disk Drive
C. Itoh Prowriter, Epson MX-80, FX-80, Gemini/Star 10X/15X or SG10/SG15 printer.
4 printer ribbons (red, yellow, blue, black)
Author: Michael Clayton
Warranty: 90 days, free replacement.
Manufacturer: Electronical Software, P.O. Box 8035, Rochester, MI 48063

Rating For YEMACYB

* Poor, **Fair,
Good, * Excellent

Program Design ***
Practicality **
Documentation ***
Value for Price **
Average **½

Public Domain 8-Bit Emulator For The ST Faces Atari Resistance

by John M. Nagy

An "Atari 800" 8-bit emulator for the ST is a reality! But Atari Corp. is blocking its distribution.

Darek Mihocka, an enterprising young Canadian programmer, has developed an emulation of the "800" Atari computer. Since it uses an image of the (copyrighted) Atari Operating System to function, Atari has to agree to let it be used. And at this point, they won't.

Ever since Atari started building the ST series of computers, the many faithful 800, XL, and XE owners faced an expensive dilemma. Many want to get into the new machine and technology, but Atari 8-bit owners have up to thousands of dollars tied up in hardware and software that all are useless on the new machine. The key to a new machine for those users (I'm one of them!) would be a way to use what software we already have and build our new software inventory as we go.

Many requests for such an 8-bit emulator for the ST have fallen on deaf ears at Atari. Developers and corporate officers alike all have repeatedly stated that: 1) No "800" emulator was being planned, attempted or even discussed at Atari, because: 2) There was, in the Atari view, no need or market for such an emulator: and 3) No practical "800" emulator could be made anyway. But all that has changed.

I have seen the "ST Transformer" in action and talked to the author. Darek Mihocka of the London Ontario area, has written and distributed several levels of beta test versions on BBS's prior to notice from Atari to stop any and all efforts to release them.

Darek originally planned to make a emulator for just about all the 6502 machines, but has since broken the emulations into separate versions for the Apple II, the Atari, and (perhaps) soon the Commodore 64. (Yikes!)

Darek Mihocka is a 20 year old college student at Waterloo University outside Toronto currently working in Seattle in a college co-op program with Microsoft, where he has hopes of doing more work in the future. He showed me that he has now developed the emulation to produce all graphics modes and even the most complicated display lists! I have had a number of public domain games and demos tested that all performed properly. The familiar blue screen with what appears to be an oversize 40 column "READY" looks mighty eerie on the ST.

Still to be developed are Player Missile Graphics and Sound. Ultimately Darek expects to have the emulation good enough to run commercial heavy-graphics software. At this point, the emulation runs about 1/4 the speed of "normal" 8-bit execution since the emulation is interpreting 6502 executions. Future work, replacing interpreted instructions with ST 68000 code, will increase this speed substantially.

Major parts of the 8-bit operating system have already been re-written (printer, disk I/O -the ST has no equivalent of the SIO "daisy chain" of the 800 series). More re-writes will be made before the Transformer is actually practical. For instance, there is only a "background" DOS in the current version, accessible through BASIC XIO commands, pokes and jumps to addresses.

The author discusses the beginnings of his project:

"The first version of the 6502 interpreter was written in Megamax C in August. I chose to first do an Apple II hardware emulator, because there are only 2 vital locations needed to get it to work: the keyboard and the screen. As it turned out, [it ran at] about 7% of the speed of a real 6502. About a month later, I had the hand coded 68000 version 'sort of' working at about 30% normal speed. The next month was spent debugging..."

"To emulate the software of another machine, you must transfer that software. When I approached Apple about this, they told me that what I am doing is illegal. They saw my project as software piracy and told me to forget it. I decided to stop spending any more time on Apple emulation."

"I ported over my copy of the Atari 800 Translator disk's image of the Revision B ROMs. I also ported a copy of Atari BASIC to use as a test file. After only a few days of hacking the Apple II routines, I got a very primitive version of the Atari emulator working. It only supported a few graphics modes and still had a major 6502 bug, but it sort of worked. I uploaded it to my BBS and to Atari's BBS as the Atari 800 Emulator Demo."

"What happened then was a big shock. I got a phone call from one of the Atari BBS sysops telling me that Atari was not pleased with what I had done. They, too, considered my program as piracy. I was told that I would be contacted within a few days to discuss the emulator."

That contact didn't come for several months, despite repeated attempts by Darek to call Atari offices. In the meantime, Darek obeyed the order from the Atari sysop and did not distribute any more of his constantly developing emulator. Only after my first article about the emulator circulated on Compuserve and many club newsletters did Alex Leavens, Atari's Technical Support man, finally call Darek and request a recent version of the emulator. Alex repeated the dark story of how Darek could not legally distribute his project, that it in effect was entirely up to Atari what would happen next.

What happened next was more nothing, except for what seemed like general harassment from Compuserve's Atari SIG sysops. My original articles were delayed in being posted, with the one sent to the 8-bit Sig never being made public. The sysops there left me messages to the effect that it was not "8-bit material," and besides, that nobody was interested in such a product. Meanwhile the article became the most downloaded item in the 16-bit SIG. Then Ron Kovacs, publisher of the free weekly Atari interest online BBS feature ZMagazine reprinted my article and sent it, as usual, to the Compuserve DL7 section. He received a voice call from the 8-bit sysops virtually warning him not to follow up the article if he wanted to keep being posted on Compuserve. They insinuated that the article was either false or at least unsupported and suggested that Ron check his facts before publishing such things. The following week, Ron ran a followup article documenting the events concerning the ST Transformer. It was written by Darek Mihocka himself. It WAS posted, and no further noises have been heard from Compuserve. As to why the SIG sysops would be trying to prevent discussion of the emulator remains a mystery.

Weeks went by with both Darek and I attempting to get comment from Alex or anyone at Atari. At last, through a what was apparently a mistaken phone connection while waiting on hold for Alex, Darek found himself talking to Neil Harris, about as high on the Atari support pole as one could hope to reach. Neil said "I've heard about you..." but professed ignorance about the sample Darek sent. He stressed that that would be Alex's area anyway, but took the time to warn Darek against trying to distribute the emulator. Neil promised that Alex would call.

Four days later on March 24, 1987, it was announced that Alex Leavens had left his position in Tech support to pursue his deeper interests in programming. His replacement seems to be Richard Frick, long associated with the ST developers package and support.

Richard called Darek about a week later, and said that he had the demo disk but hadn't looked at it yet. He asked a lot of questions about what it could do, and seemed surprised to hear it was fairly well developed. Frick again warned about their copyrights. Darek reports that Frick told him that Atari WAS developing their own 8-bit emulator for the ST (despite all the public denials), as well as an Apple emulator for the ST. Frick said that it was "possible" that Atari would be interested in making some use of Darek's work, but that there would be "no way" that it would be released as a public domain program, and mentioned $19.95 as a conceivable price... IF it were to be used at all. No

continued on page 306

Note And Point Collected Atari Bits

by John Nagy

Who am I? Just another Atari maniac. My desk has a 256K upgraded 800XL (one done by Claus Buchholz himself) with an ICD Corp. 256K MIO a box, a Happy enhanced Atari 1050 disk drive, a Smarteam 1200 baud modem, a Star SG-10 printer, and a color USI monitor. No, no ST for me yet. I use my Atari daily for my writing (I put out a monthly combined newsletter for 8 clubs called Michigan Atari Magazine), for my private legal practice, and for programming the BBS I run for the CHAOS Club in Lansing, MI (517-371-1106, same hardware plus a 10 meg hard drive). I will be bringing *Computer Shopper* readers News and Rumors of the Atari world, gleaned from user groups, networks, meetings, conversations, personal interviews, and anywhere else I can find it.

I hope you like what you read, and in the coming months I expect to cover a lot of ground not only in news but in technical hints, fixes, patches, little known features, and more. I will try to indicate where any particular bit of information came from if it seems to be the sole or original source. I'm sorry if I mention somethng that came from your area and I don't say so, but my main purpose here is to spread the word. So, lets get going.

Batteries Included, Canadian makers of lots of great 8-bit and ST Atari titles (and noted for a recent stance of No Copy Protection) has just been bought by Electronic Arts. EA has developed the opposite reputation (Heavy Copy Protection, Anti-Atari, etc.). It looks like EA will continue to support many existing BI products, but is likely to drop those under development. Most likely to be dropped is Paperclip Elite, since it would be a direct competitor with EA's MS Write. 8-bit support, look out!

Atari Stockwatch—Bobbling around the $27 mark for weeks now in active trading. The bad PR on the Mega delay of the IBM-compatible machine seemed not to do much more to depress the stock value than the original announcment seemed to push it up.

Atari Corp of Scandinavia? Yes, Atari opened a "daughter" corporation in Sweden sometime in January, 1987. Work is progressing there with a dealer network (reported in Ron Kovac's *ZMagazine*), but further details of what Atari needed a full fledged corporation for are fuzzy. They have been selling machines overseas at a 2-to-1 ratio faster than stateside. . . maybe they plan to move?

Alex Leavens leaves Atari as Manager of Technical Support. As of March 24, Richard Frick is handling Alex's job, fielding the technical questions and problems of users everywhere. Alex is said to have left to pursue his desire to do more programming and less management, and no other information has surfaced. Let's hope that Richard can do less grinning (a Leavens trademark message ending, as in "No Comment—(grin)") ~~and~~ more talking when faced with ques-

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ComputerEyes—Video Digitizer for The Atari ST

by John J. Anderson

Among Atari ST owners with a penchant for graphics, there has been perhaps no single product so long-awaited as a quality video digitizer. Video digitizers for the ST have in fact hit the market in the past, but until now have not been largely worthy of the hardware they purported to support.

But things are different now that ComputerEyes, from Digital Vision, has appeared on the scene.

ComputerEyes is a full-color video digitizer for the Atari ST, which allows users to easily capture images in full color from any standard video source (camera, VCR, or laserdisc). Supporting all of the graphics capabilities of the ST, ComputerEyes represents a unique and relatively low-cost means of capturing monochrome or color graphics on an ST display.

The package consists of a hardware unit that connects in the cartridge slot of an Atari 520 or 1040ST, and a software program that drives the unit. Under simple, mouse-driven software control, the video signal is scanned and images captured into the graphics memory of the computer. Capture time is just six seconds for the lo-res 16-color or intensity level mode, twelve seconds in the mid-res four-color mode, and 24 seconds in the 640 x 400 hi-res monochrome mode.

Applications for ComputerEyes for the ST include acquiring images for the popular graphics drawing programs (such as Degas or NEOchrome), capturing real-world images for desktop publishing or other printing programs, image databases, and even industrial applications like pattern recognition, spatial measurement, or security. ComputerEyes images can also be transferred to T-shirts for fun or profit.

A unique feature of ComputerEyes is that, once acquired, images may then be adjusted, or "fine-tuned," using the system software to obtain the desired image or effect. Images may be displayed or re-displayed in levels of gray (two, four, eight, or sixteen intensities) or full color. Changes to the brightness, contrast, or red, green, and blue parameters can all be performed after image acquisition to yield the best-looking display. The user also has the ability to specify color coarseness (more on that ahead) and the number of colors or intensities in the image. Acquired images can be saved to disk as standard Degas, Degas Compressed, or NEOchrome compatible files. The software package features an added bonus of translating screens to or from either format.

ComputerEyes is a system consisting of a carefully planned combination of hardware and software; neither has any worth without the other. The system takes a slow sample of a video signal present at the video input connector on the hardware module. During every vertical scan period, the system takes in 200 samples, or

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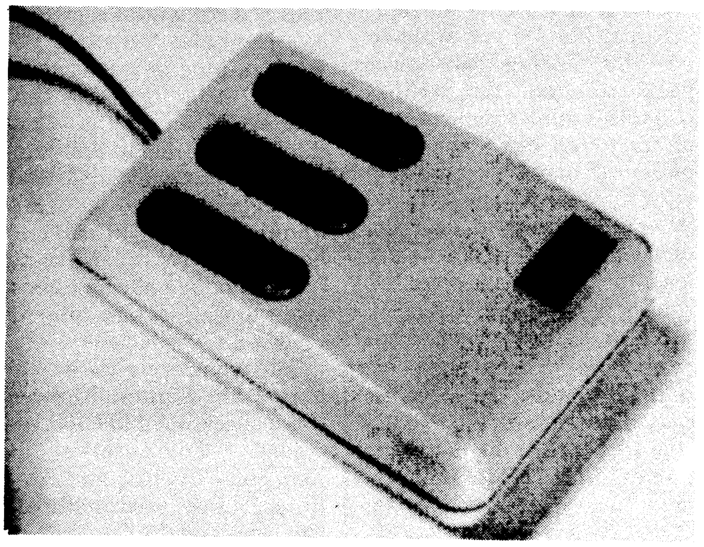

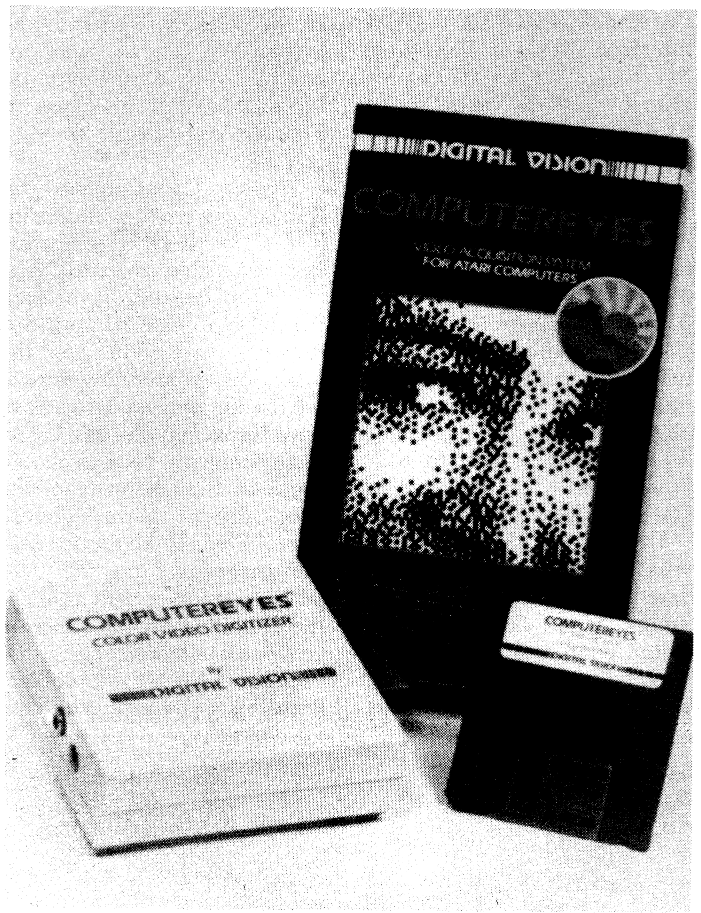

ComputerEyes package

Hacking The ST

by Wynn Rostek

The time has come to discuss the format of the SF354 floppy disk drive used on the Atari ST. The SF354 is the single sided drive distributed with the 520 ST. The drive uses 3.5 inch disks and holds 360K bytes of data.

The disk contains 9 sectors per track. Each sector is 512 bytes long. There are a total of 80 tracks yielding 368640 bytes of storage. As with any disk system, in addition to the data saved on the disk, there is additional information about each file that allows the system to keep track of the file.

The track numbering starts at 0, that is the outermost track on the disk is track 0. Sectors on the other hand start with sector 1. Sector 1 of track 0 is known as the boot sector. The boot sector contains a short program that allows the system to bring the rest of the operating system into memory from disk.

In typical usage, upon system reset, the information from track 0 sector 1 is loaded into memory and control is then passed to the routine. The small routine then loads in the rest of the operating system. Even though the boot sector is a fascinating creature, it is a little beyond the scope of this report, so it will be saved for another time.

The sector right after the boot sector is the start of the first File Allocation Table or FAT. The FAT is used to keep track of which sectors belong with which file, and will be discussed in greater detail later. The first FAT is made up of sectors 2, 3, 4, 5 and 6 of track 0.

Because the FAT is so important to the system, there are 2 identical copies kept on the disk. The second FAT starts at sector 7 of track 0 and is made up of sectors 7, 8 and 9 of track 0 along with sectors 1 and 2 of track 1.

After the second FAT appears the root directory. The root directory contains the file name, information about the file itself, and a pointer into the file allocation table. The root directory is made up of sectors 3 through 9 of track 1. The root directory will also be discussed shortly.

After the root directory, we finally come to the data area. Files are stored starting at sector 1 of track 2. Tracks 2 through 79 are used for data storage.

The root directory contains information about each file that appears in the main directory. The ST uses a tree-structured directory, so not all files on the disk will appear in the main directory, but the path to any file on disk will always start with the main directory.

Each entry in the main directory consists of 32 bytes. The first 11 bytes make up the file name, which is broken up into an 8 byte name and 3 bytes for the file extent. The byte following the extent is the attributes byte. The attribute byte contains a collection of status bits associated with the file, and will be explained a little later.

The next 10 bytes after the attribute byte are reserved for future use, and contain 0s at this time. After the reserved bytes come the file time. The file time is a record of the time the file was last modified (or created) and is saved in two bytes. Any write operation to the file will update the value of the file time field.

In order to get the complete time packed into 16 bits, the time information is arranged as shown in Table 1 on page 333. You will notice that there is no bit for 1 second, so the file time is only accurate to the nearest 2 seconds.

The two bytes following the file time field are the file data field. Just as with the file time field, any write operation to the file will update the file date field. Table 2 (page 333) contains the encryption for the file date field.

Both the file time and file date are in byte reversed format, so if the high and low bytes are exchanged, the information is in simple ascending order. The year numbering may throw you at first, because there is an offset of 1980. To get the correct year, add 1980 to the years you calculate from the file date, (1987 will show up as 7 years.)

The 2 bytes after the file date field are the pointer into the file allocation table. These two bytes define the first cluster allocated to the file. (This field

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HabaCom—A Telecommunications Program

by W. Krieger

HabaCom is a telecommunications program for Atari ST computers. It is the first ST communications program that I've seen that has a 100% GEM interface. Most of the others I've looked at are TOS programs, with the exception of FLASH from Antic software which uses a combination of GEM and TOS.

HabaCom version 1.06 has an impressive number of features at a reasonable price, $49.95 (Haba Systems Inc., 6711 Valjean Ave., Van Nuys, CA 91406) among the many features are six types of terminal emulation. Five transfer protocols, (six if you count ATBF which is used in conjunction with Xmodem). And HabaCom isn't copy protected.

In addition HabaCom has what are becoming the standard features of Telcom programs. Auto Dial and Redial, Auto Logon, text capture, etc.

HabaCom uses a different approach to storing the dialing commands than, say, FLASH or CONNECT. With both of these you have a phone directory, which contains your different numbers and the name of the systems, tied into the directory in one way or another is the Auto Logon information or in the case of FLASH the script files to execute.

The way HabaCom does this is to have you set up all this information for any one system, then save this as a disk file. HabaCom can only have one of the files resident at any one time. This system has the disadvantage of adding steps to the dialing process. In order to have HabaCom dial and log on to a system you need to choose the load file option from the drop down menu, choose which file is to be loaded into the program from the item selector window, then after the file is loaded hit the function key you loaded with the dial command. My biggest problem with this is the time needed to load the data file into the program. I'm spoiled by programs that load all this information at start up.

HabaCom's system does have it's advantages however. You can have an unlimited number of data files, stored on as many disks as you like. This can also come in handy to keep password and account number information secure. You can leave HabaCom on your hard disk but keep all your data files on floppies which can be easily secured.

Another security feature of HabaCom is the ability to "password protect" your dialing data files. If you want to use this feature just select password from the settings menu this allows the entering of up to an eight character password that is saved along with the rest of your settings. When you want to load the saved file the program won't load it until you have given the proper password.

The protection scheme is optional and doesn't have to be used at all, or you can have a different password for each file. You can use any combination of protected and non-protected files that you want.

HabaCom's Auto Logon routines, while not as powerful or flexible as a script language, are easy to use and do what they are intended to. To use the routines, you need to tell the program to watch for certain character strings. When it receives these strings it will then issue a command. These are set up in a table accessed from the auto logon menu. This is a straightforward process just enter the string you want the program to watch for in the "After receiving this" column. Then in the "Issue this" column enter the string you want HabaCom to send. The biggest limitation to these routines is that you can only have eight of them. Still that is enough to log on to just about any system and get into the mode or SIG that you want.

The transfer protocols supported are Kermit, Xmodem (both checksum and CRC versions), Compuserve B, Xon/Xoff, Cts/Rts, and Atari Binary. I've used both the Xmodem and the Compuserve B and haven't had any problems at all. The Compuserve B protocol is a little slower than Xmodem, but is suggested when downloading from Compuserve.

Compuserve is well known to have trouble with standard Xmodem timing constraints. Problems which cause most terminal packages to include special "relaxed" Xmodem modes to work around. HabaCom's use of the B protocol avoids the problem entirely.

The terminal emulations provided are VT100, VT52, CRT, ANSI, 520ST, and TTY. While this is an excellent selection and I haven't had any problems with any of the emulations it would be wrong to imply that you are truly getting six different terminal types to choose from.

First off, the documentation states clearly the VT100 emulation is not complete. Now the VT100 uses a superset of the VT52 command set so when you implement a VT100 you automatically have a VT52. Also the 520ST uses the screen commands of the VT52. So these three terminal types are very similar.

Nowhere, that I can find, in the documentation do they tell you what type CRT the CRT emulation is emulating. So you just have to try it and see if it works with the system you are calling. In all terminal modes HabaCom has an annoying flicker on a color monitor. This may not be a problem with a monochrome system. The flicker isn't terrible and you can live with it but the program would be better without it.

Another minor problem with the terminal emulations is that they don't recommend using the ANSI, VT52 or VT100 modes at speeds in excess of 4800 baud. For remote use this is no problem, but if you want to use an ST in place of a VT series terminal on a main frame or Mini computer HabaCom isn't the software you want to use.

The biggest problem with HabaCom's terminal emulations is the programs biggest selling point. It has a 100% GEM interface. This means that the program must run from within a GEM Window. Now the display area of an ST color system is 25 lines of 80 standard characters. Most terminals are 24 lines of 80 characters.

The problem comes in when you look at what makes up the GEM window once you subtract lines for the Menu Bar, Title Bar, Status line, and time display line, and you subtract characters for the scroll bar. There is no way to have a standard display of 24 lines by 80 characters.

In fact you end up with 22 lines of 76 characters. HabaCom's author Bill Long tried to work around this problem in two ways. The first is letting you turn on auto line wrap which will display any characters that exceed the line limit on the next line. This is O.K. but you end up with a lot of 3 and 4 character lines and broken words.

The second alternative is better, which is a smaller print font that will fit 90 characters on a line within the GEM window. Of course this smaller text is harder to read than the standard font.

All and all terminal emulations are not this program's strongest feature. Indeed I didn't expect to like HabaCom because I knew these and other limitations, (like having to reach for the mouse all the time) are inherent in a GEM program.

But the more I use this program the better I like it. It has a lot of nice little touches that show the author really understands using a telecommunication program. Two of

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Digitized photo

ComputerEyes continued from page 145

one for each of the Atari ST's graphics rows. Thus, one column of pixels are stored every vertical scan, or 16.6 milliseconds. The point in time during each horizontal scan period that the samples are taken i delayed from the horizontal sync by an amount that is very slowly increased as the scan progresses. The result is that successive columns of pixels are acquired, beginning with a short delay from the horizontal sync (left side of image) to a long delay (right side).

A video sample consists of three analog voltages that represent the intensity values of the red, green, and blue components at a particular point in the video image. These voltages are multiplexed into a 6-bit analog-to-digital converter, the output of which is read by the Atari ST. The software stores these raw image data values away in memory during the progress of a scan. It then maps this value to the Atari ST's graphics memory based on what type of image is being acquired.

The ComputerEyes hardware consists of a single printed circuit board mounted inside a plastic enclosure that plugs into the ST's cartridge port. This board contains the circuitry required to perform the slow-scan image acquisition. The software running in the ST controls the acquisition of the image.

The ComputerEyes control panel consists of a collection of on-screen "buttons" and "slider controls" that allow you to control operation of the package with the mouse. In fact, the only time you ever have to use the keyboard is to enter the names of image files that you want to save. At any time, you can view the image concurrently in memory by simply pressing the right button on the mouse. Pressing the same button again returns you to the control panel screen.

Clicking on the "capture" button causes the video signal present at the input connector of the ComputerEyes module to be scanned and displayed on the ST's monitor. The system uses the current control panel settings of resolution, scan speed, and gray levels to acquire and display the image. While the video input is being scanned, a message to that effect is displayed on the screen. When the scan is complete, a bell tone is heard (handy, if a camera is being used, to let a subject know he or she may now move). The screen is then painted from top to bottom with the image that has been captured, processed according to the settings of the control panel.

If you are acquiring a color image, then after the scan period the system takes another few seconds to analyze the image to determine the color palette it will use to paint the image. It displays a message on the screen to this effect, and then paints the screen.

Clicking on the "adjust" button causes the last-acquired image to be repainted on the

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Apple 3.5" Drives
continued from page 305

technology, as practiced by Apple stands today. Although other manufacturers have introduced 3.5" drives which store as much as 2 Mbytes, Apple has chosen to stick with single density drives for compatibility, and reliability—any diskette made on any 3.5" Apple drive can be read on any other 3.5" drive without problems.

Specifically by machine, the Apple IIc will only work with the Unidisk. If you have an early Apple IIc, the dealer which sells you the Unidisk will upgrade your IIc's ROM for free. You can either purchase the drive bundled with Catalyst, or by itself.

On the Apple II, II + , and IIe you will need to use the Unidisk 3.5, with the controller card. You can purchase a bundled package, including the Unidisk with a controller card and the Catalyst software, or purchase the drive and controller card separately.

On the Apple IIgs you have two choices, you can purchase the Apple 3.5 drive (the standard IIgs drive) or the Unidisk 3.5. Up to 127 Unidisks can be attached to an Apple IIgs, but only two "dumb" Apple 3.5 drives can be attached. If you are mixing Unidisks and Apple 3.5 drives, the Unidisks should be attached first in the daisy chain. For me the picture is clear, the Unidisk 3.5 is a much better choice, and if you are purchasing a IIgs, INSIST that the dealer sell you Unidisks, rather than Apple 3.5 drives with your system. If you already have a IIgs, then purchase Unidisks exclusively as your expansion drives when you decided to expand your 3.5" storage capabilities.

For any member of the Apple II family, once you have at least one 3.5" drive on your system (with its controller card, ROM, etc.) you can add as many extra Unidisks as necessary, up to your budget's limit—or 127 drives, whichever comes first. ProDOS 1.1.1 and earlier will support only two drives per slot, but the new ProDOS 8 will support as many devices as you have.

The original Macintosh was only designed to support 400K external drives, but a simple ROM upgrade makes it compatible with 800K double sided drives. Later Macs have the proper drivers already in the ROM, and will automatically operate with any 3.5" Apple compatible drive.

The Unidisk 3.5 is clearly the most powerful, and versatile 3.5" drive available for the Apple. It will work with any Apple, with any interface card, and can be daisy-chained. It's the only 3.5" drive which works with the Apple II, IIe, and IIc, and a much better choice for the IIgs than the standard Apple 3.5" drive. On the other hand, it does require the cable modification for use with the Macintosh. If you do most of your work on a Mac Plus and a IIgs, you may want to use a IIgs drive as your standard external drive, since it will work on both machines without any modifications.

Mention that you read about it in *Computer Shopper*. ●

LoDown Announces 155 MB And 240 MB SCSI Hard Disk Drives For Appleshare

LoDown, leading manufacturers of hard disk, tape backups, image scanners and W.O.R.M. devices for the Apple Macintosh product line, announces two new high capacity SCSI hard disk drives, offering complete compatibility with Apple's newly announced file server software, Appleshare.

These high capacity drives offer network users the ability to store large amounts of data on a file server using the Appleshare software. With LoDown's tape backup, users can backup to their individual workstations, or if the tape backup is connected to the network server, you can backup in the foreground mode. LoDown tape drives can backup and/or restore any hard disk compatible with the Macintosh by choosing either the full volume, incremental or selected file options.

The 155 and 240 megabyte hard drives are also the perfect companions for LoDown's 400 and/or 800 MB. Write Once Read Many (W.O.R.M.) optical disk.

LowDown's 155 and 240 megabyte hard drives are available now. Suggested retail price for the 155 SCSI hard disk is $3995. Suggested retail price for the 240 megabtye SCSI hard disk is $6595.

For additional information contact LoDown, 10 Victor Square, Suite 600, Scotts Valley, CA 95066; (408) 438-7400.

Mention that you read about it in *Computer Shopper*. ●

Public Domain
continued from page 142

discussion of what the author would get out of it. Regardless, it was made very clear that Atari would call the next shots under threat of legal action.

Darek suggested trying to get around Atari's objection by devising a program that would extract the required copyrighted data out of the user's own 8-bit Atari machine, port it to the ST, and integrate it into his emulator... but even that was not satisfactory to Atari's Frick. "They tell me that it will encourage piracy... and that it's illegal anyway," says Mihocka. "Contributory Infringment."

Mihocka then mentioned that he was working with Wes Newell, known for the Newell Industries and CDY products like the Fastchip, Omnimon and Omniview for the 8-bit Atari. Wes had to re-write the Atari operating system in order to market his products these last 4 years. Frick replied that the Newell O.S. was already infringing on the Atari O.S. copyrights, and that Atari would try to prevent the use in the Transformer of that system as well as their own. He gave no explanation (other than oversight) of why Atari hadn't tried to stop Newell before this.

Just before presstime, I talked with Richard Frick to try to get a clearer picture of the Atari viewpoint. Their opinion of the ST Transformer is not very high. "Darek essentially reverse engineered the CPM emulator, using Atari's methods to accomplish the 8-bit emulation." Frick continued, "The system is not usable as it is, at 25% speed... and to release it into the public domain could end the development of the emulator before it reaches a truly worthwhile stage." The Atari view is that some sort of commercial incentive will result in a useful emulator in a meaningful time period, but that Atari neither had the programmers on staff to accomplish this nor were they working on their own similar project. He added that he very much hoped that an agreement could be made with Darek that would be mutually satisfactory and would result in a good emulator. Frick concluded by saying that if Darek really wanted a good Public Domain emulator to eventually be completed, he should be willing to make his Source Code public as well as his program. This would allow other programmers to build on the Transformer and develop the system.

Darek is presently unwilling to go that route, because he believes that his accomplishment in getting "the impossible" job this far along might be overshadowed by the tack-on efforts of another programmer. Darek refutes the claim that the ST Transformer was a result of reworking the CPM emulator, pointing out that his own Apple emulator (that served as the model for the Transformer) was being circulated in October of '86, before the CPM module was released by Atari. Further, the original code is all in Megamax C, hardly what one would expect to result from dissecting Atari code. He also remarked that the reason for going Public Domain is not simply because he intended it that way, but rather that the Atari infringement complaint made it impossible to market the

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Note and Point

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tions about present and future projects at Atari. Frick has already confirmed that Atari is working on both the rumored Apple emulator as well as an 8-bit Atari emulator for the ST.

Other announcments from Neil Harris of Atari made at the Allentown (Pennsylvania) Atarifest at the end of March: *The XEP80 8-bit 80 column display box has been finalized and "sent to be manufactured." Summer, he says. *The 3½" disk drives for the 8-bit line is on hold and may be dropped. The 65XE will be released as a NINTENDO-like keyboardless box as Atari battles for the home game market. Expect the 65XE we know to be dropped, with the new unit offering an optional detached keyboard for gamesters who want to dabble with computing. Atari expects it to be big and cause a new flood of game software for the 8-bit line, hopefully fully runnable on the "real" computers.

Would you believe a 1200 baud Atari modem. The company that seems to have changed their motto to "Products without the Production" now promises that the modem they announced over a year ago will be tested by the FCC and released "soon." The modem "will" support the 8-bit direct connection as well as the ST (standard) RS-232 cable. An 8-bit handler (totally new and not compatible with anything) and a special version of Keith Ledbetter's Express! terminal program will be sold separately! Yike!

It looks more and more like the 1040ST will fall out of the Atari product line once the Mega ST line is available. Rumors abound as to 520s being sold in Canada using up stocks of the 1040 case and inboarding the single sided disk drive and power supplies are adding fuel to that story, but nothing from Atari on it. Another 1040 detail: It appears that the RF modulator is now included, unlike the first versions.

Another Atari orphan is being bought back (sorta...) by the manufacturer. If you have a 600XL, send it to Atari with $35 and get an 800XL in exchange. Not a bad deal, even though any 600XL can be upgraded to 800XL memory for under $10 in parts. Mail to: Atari Customer Service, 90 Carribean Drive, Door #17, Sunnyvale, CA 94089.

We have all heard by now that the Mega ST series will include Blitter capabilities that will increase screen writing time 5-10 times over "normal" ST speed, and that the Blitter will be available as an upgrade chip set for the existing STs (around $120). But I was recently asked if the Blitter could be turned off if needed...like for games where a fivefold increase in play speed would be, um, challening. (Imagine flying a Cessna F-16 in flight simulator...) Answer is yes, you can turn it off.

M.A.C.E., a Detroit area Atari Club that once boasted 1200 members before hard times and internal political disaster peeled them to today's 400 count, announced in their March newsletter that guests at their meetings will no longer be allowed unless they pay a $2 fee (per family), for which they also will get a copy of the M.A.C.E. newsletter and membership literature. Be advised, fellow Atarians, you are not as welcome as you might guess at some club meetings, though I doubt that this policy will be copied by many "user friendly" groups.

More panic in Detroit: *Antic Magazine*'s publisher Jim Capperell wrote to Detroit's M.A.C.E. to notify them that they had to remove any and all Antic programs from their BBS. He reaffirmed that they are copyrighted, and to exchange them is piracy. Despite previous "understandings" about such things, it now looks like Antic wants to play hardball. Nothing was said in the letter about library inclusions of Antic material, but that is probably next. This will be quite a blow to many smaller clubs that have had almost nothing else in their club library but Antic and Analog material. Analog went on record last year saying that their materials could not be distributed before the publication date of the magazine, a very reasonable policy. Even a six-month "cooling" period would be understandable. Antic must not feel that good relations with user groups is worth trading for whatever profits they may reap from old and widely traded software. Part of the reason may be that Antic is now re-releasing some of their older programs as "Specials" on Compuserve, along with lots of mentions that this material is copyrighted and not for redistribution. This all may be part of an agreement to make Antic's presence bring more money to Compuserve.

GEnie, a rapidly growing telecommunication service similar to but priced below Compuserve and the Source, has a special deal for Atari owners (since Atari maintains a direct access on GEnie, with frequent on-line conferences with well-placed officials). Register before the end of the year and save the $18 registration fee. Call 1-800-638-9636 for details.

Games Computers Play plays no more. Just after an expanded text-only service went into effect to supplement the innovative graphic-oriented telecommunications service, GCP abruptly closed up on February 28. Details are not plentiful, but money problems are the cause. They don't expect to reopen as of this writing.

8-bit DOS On A Cart: Spartados from ICD is not the only player in the DOSCART game anymore...and the competition is coming from Micheal Wheeler of Alaska. He has put Atari DOS 2.5 on a chart and added true double density support and a RAMdisk handler. Although it is memory-greedy (16K when resident), the cart can be switched out manually. Another switch handles BASIC in or out. This looks like a basement operation, as plans and code for EPROM burning yourself are available for $5, and we don't have a price on finished carts. Contact Michael E. Wheeler, P.O. Box 104013, Anchorage, Alaska, 99510.

Thats a wrap for this month, next time, more news, and let's get into some quick fixes for common Atari hardware failures.! ●

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Applying The Atari

continued from page 141

accurate information for inclusion in the bulletin board section of *Computer Shopper*

George T. Fuller
Lexington, North Carolina

You just did—good idea. Too often we have to put up with numerous "the number you have reached is not in service" recordings before an operating bulletin board is reached. So please, sysops or bulletin board users, keep us updated.

Newsletters

This month's mail brings H.A.C.E. News, the newsletter of the Hickory Atari Computer Enthusiasts (H.A.C.E., P.O. Box 12, Hickory, NC 28603). Heavier on the technical side than most newsletters, the March 1987 issue contained an article on modems, a "Tech Tips" column that described how to get ½K more out of your 64K Atari through a hardware modification, and a "Gizzmos and Gadgets" column that discussed using the joystick ports for output.

Electronic Checkbook

This month we will begin entering Electronic Checkbook, a program that lets you position all information as desired, thereby allowing you to use virtually any continuous check format available. As mentioned last month, both NEBS (1-800-637-0118) and MOORE (1-800-828-7946) are two companies that offer continuous checks in their computer forms catalog.

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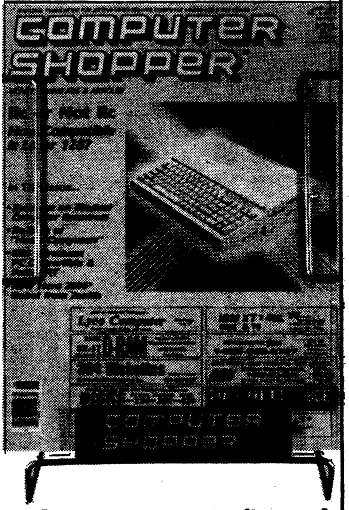

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COMPUTER SHOPPER

Electronic Checkbook lets you define up to twenty names and addresses of companies/utilities that you often write checks to. Writing checks then merely involves pressing the number of the payment recipient and entering the dollar amount. Your account balance is maintained and displayed throughout the session. The first part is listed under the "Electronic Checkbook" heading. Enter the program using Program Perfect and SAVE it to diskette. The second part, which contains the functions, will be listed next month.

Enhanced Version

Due to the popularity of the enhanced version of Forms Generator offered in the November column (a new version of which is currently being commercially marketed) and to requests from readers, I have promised more enhanced versions of listed programs in the future. This month, a diskette version of Electronic Checkbook with complete documentation will be available. As I have explained in the past, I have much more freedom when writing a program that will be distributed on disk rather than listed in the column. I can take more steps to compress the program (and therefore squeeze in more features) and I can add more machine language routines, both of which tend to make magazine listings unreadable and impossible to enter.

The enhanced version of Electronic Checkbook will offer the following additional features not contained in the standard listed version: a record of each check written and an on-going balance will be automatically kept on diskette, a greater number of predefined names and addresses will be allowed, a second formatting screen will be provided for printing information on the "stub" or second page of the continous check, and general speed and error handling will be improved. See end of this column for information on purchasing either the standard or enhanced version of the program.

Number To English Converter

One important component of this month's checkwriting program is an interesting subroutine that converts a numeric value into its written English equivalent. The written amount can be placed on the check along with the numeric amount. This is an important safeguard, since computer-printed numbers can be easily modified or overwritten. Unfortunately, some checks do not provide for a written-amount line, and some commercial check writing programs for various computers will only reiterate the number value, albeit embedded in asterisks, instead of providing an amount in words.

Enter the program listed under the "Number to English Converter" and RUN it. You'll be asked to enter a numeric value. When you enter the number and press RETURN, the program will display the amount in words, as it would print it on a check. Following are some examples:

ENTER A NUMBER: 325
THREE HUNDRED TWENTY-FIVE AND 00/100

ENTER A NUMBER: 1050.35
ONE THOUSAND FIFTY AND 3/100

ENTER A NUMBER: 17.90
SEVENTEEN AND 90/100

ENTER A NUMBER: 999999999.99

ENTER A NUMBER: 24535.20
TWENTY-FOUR THOUSAND FIVE HUNDRED THIRTY FIVE AND 20/100

The program works by breaking up the integer value of the entered number into three digit chunks (the cents amount is retained until the end). Therefore, 24535.20 is converted into 024 and 535. Each three digit chunk is then converted to words based on its value. Word amounts for three digit number chunks under 20 are read directly from the data statements on line 500 and 510. Greater values are converted to words based upon the placement of the digits. For example, in 024, the 2 is converted to TWENTY- and the 4 is converted to FOUR. Therefore 024 and 535 become TWENTY-FOUR and FIVE HUNDRED THIRTY-FIVE, respectively. In the event of a number such as 020 or 530, the hyphen is removed from the last word so we would have TWENTY and FIVE HUNDRED THIRTY, rather than TWENTY- and FIVE HUNDRED THIRTY-, with the unnecessary trailing hyphens.

Next, the program takes into consideration the placement of each of the three-digit chunks. Since the left-most digit of 024 is in the thousands place, a THOUSAND is added to the TWENTY-FOUR to give us TWENTY-FOUR THOUSAND. The left-most digit of 535 is in the ones place, so the FIVE HUNDRED THIRTY-FIVE is left as is.

Finally, the cents value is rounded to two places if necessary (i.e. if the entered amount were 24535.198, the cents amount would be rounded to 20), a "/100" is tacked on to it, and the fraction is added to the word amount for the final amount in words: TWENTY-FOUR THOUSAND FIVE HUNDRED THIRTY FIVE AND 20/100.

Have fun trying different values. An interesting programming idea: write a program that converts written words to numeric values! Next month, we'll see how the number-to-English routine is used in the Electronic Checkbook program.

Next Month

We will enter the second part of Electronic Checkbook and begin to test the program.

Reader's questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope (SASE) for a personal reply. Due to volume of letters received, only a selected number of personal responses can be given each month.

The complete listed version of Electronic Checkbook on diskette is available from the author for $7, postpaid. The special enhanced version, with corresponding documentation is available for $11. Pleas make checks payable to "Jeff Brenner" and specify your disk drive model. Please allow 4-8 weeks for delivery.

"Program Perfect" is a utility used to check for typing errors while enteirng programs from this column. Readers can send $5 for a diskette or a SASE for a listing of this program.

Address all correspondence to: Jeff Brenner, "Applying The Atari 6/87" c/o *Computer Shopper*, P.O. Box F, Titusville, FL 32781-9990. ●

ELECTRONIC CHECKBOOK

```
UEJ 10 REM ELECTRONIC CHECKBOOK
KHJ 20 REM COPYRIGHT 1987 JEFF BRENNER
XNJ 30 GOSUB 60:GOSUB 430:GOSUB 540
ODJ 40 GOSUB 760:GOSUB 860:OLD=1773:L=OLD
BIJ 50 GOTO 1030
LKJ 60 VNTP=PEEK(130)+256*PEEK(131):VNTD=PEEK(132)+256*PEEK(133)
USJ 70 DIM P$(512),T$(130),NUL$(1):PM=PEEK(106)-8
NRJ 80 DIM NN$(100),TMP$(130),A$(130),TXT$(150)
YGJ 90 VT=PEEK(134)+256*PEEK(135):AT=PEEK(140)+256*PEEK(141)
YJJ 100 VAR=N0:FOR I=VNTP TO VNTD
RRJ 110 IF PEEK(I)>128 THEN T$(LEN(T$)+1)=CHR$(PEEK(I)-128):GOTO 140
RKJ 120 T$(LEN(T$)+1)=CHR$(PEEK(I))
EFJ 130 NEXT I:PRINT "ERROR - CHECK BEGINNING PROGRAM LINES.":END
JJJ 140 IF T$<>"P$" THEN VAR=VAR+1:T$=NUL$:GOTO 130
GWJ 150 IF PEEK(VT+1)<>VAR THEN VT=VT+8:GOTO 150
RYJ 160 A=PM*256+512-AT:H=INT(A/256):L=A-H*256
OVJ 170 POKE VT+2,L:POKE VT+3,H
DFJ 180 DIM C128$(1),CLS$(1),DN$(10),SCRL$(40):C128$=CHR$(128):CLS$=CHR$(125)
LIJ 190 C85=85:C84=84
BPJ 200 SCRL$(1)=CHR$(254):SCRL$(40)=CHR$(254):SCRL$(2)=SCRL$
FMJ 210 C84=84:C85=C85:SK=764
TZJ 220 DIM DSN$(84):FOR I=1 TO 7:RESTORE 250
AXJ 230 FOR J=1 TO 12:READ N:DSN$(LEN(DSN$)+1)=CHR$(N):NEXT J:NEXT I
PVJ 240 DSN$=DSN$(1,80)
WFJ 250 DATA 255,126,60,24,60,126,255,126,60,24,60,126
CDJ 260 DIM X(32),Y(32):FOR I=1 TO 32:X(I)=0:Y(I)=0:NEXT I:RESTORE 290
SWJ 270 FOR I=1 TO 8:READ N,V:X(N)=V:NEXT I
SYJ 280 FOR I=1 TO 8:READ N,V:Y(N)=V:NEXT I
PQJ 290 DATA 30,-1,31,1,10,-1,11,-1,9,-1,5,1,6,1,7,1
RSJ 300 DATA 28,-1,29,1,10,-1,14,-1,6,-1,9,1,13,1,5,1
RTJ 310 DATA 28,-1,29,1,10,-1,14,-1,6,-1,9,1,13,1,5,1
IXJ 320 DIM TAB$(82),SHOW$(74),GRAB$(74),INVERSE$(59)
KLJ 330 P$(1)=CHR$(0):P$(512)=CHR$(0):P$(2)=P$
EWJ 340 P$(61)=CHR$(15):P$(64)=CHR$(15):P$(62,64)=P$(61)
MMJ 350 DIM DAT$(2880),SP$(100),SP1$(1),W$(120)
XXJ 360 SP$(1)=CHR$(32):SP1$=SP$:SP$(100)=CHR$(32):SP$(2)=SP$
MWJ 370 OPEN #1,4,0,"K:":OPEN #3,9,0,"E:":OPEN #2,12,0,"S:"
TOJ 380 POKE 559,46:POKE 54279,PM:POKE 53277,3
MUJ 390 POKE 710,192:POKE 712,192
VAJ 400 ML=PEEK(560)+256*PEEK(561)+16:POKE ML,7
TSJ 410 POKE 752,1:POKE 708,204:POSITION 0,11:PRINT "ELECTRONIC CHECKBOOK"
AWJ 420 RETURN
```

program continued on page 311

Electronic Checkbook continued from page 310

```
CVJ 430 DAT$(1)=CHR$(0):DAT$(2880)=CHR$(0):DAT$(2)=DAT$:W$=DAT$
ELJ 440 DAT$(1)=C128$:DAT$(240)=C128$:DAT$(2,239)=DAT$
HCJ 450 DAT$(2641)=C128$:DAT$(2880)=C128$:DAT$(2642,2879)=DAT$(2641)
FFJ 460 W$(1)=C128$:W$(20)=C128$:W$(2,20)=W$
ANJ 470 W$(101)=C128$:W$(120)=C128$:W$(102,119)=W$(101)
WGJ 480 W$(21,100)=SP$(1,80)
KCJ 490 FOR Y=3 TO 22:DAT$(Y*120,Y*120+119)=W$:NEXT Y
TOJ 500 TAB$(1)=C128$:TAB$(82)=C128$:TAB$(2)=TAB$
TQJ 510 FOR I=11 TO 71 STEP 10:TAB$(I,I)=CHR$(190):NEXT I
PIJ 520 DAT$(241,360)=TAB$:DAT$(2520,2639)=TAB$
AYJ 530 RETURN
KWJ 540 RESTORE 580
MTJ 550 FOR I=1 TO 59:READ N:TOT=TOT+I+N
INJ 560 INVERSE$(I,I)=CHR$(N)
XYJ 570 NEXT I
PKJ 580 DATA 104,104,104,170,165,88,133,208,165,89
OYJ 590 DATA 133,209,104,104,168,240,16,24,165,208
MKJ 600 DATA 105,40,133,208,165,209,105,0,133,209
QOJ 610 DATA 136,208,240,24,138,101,208,133,208,165
OTJ 620 DATA 209,105,0,133,209,104,104,168,136,177
LLJ 630 DATA 208,73,128,145,208,136,16,247,96,-1
KXJ 640 RESTORE 670
MRJ 650 FOR I=1 TO 74:READ N:TOT=TOT+I+N
SRJ 660 SHOW$(I,I)=CHR$(N):NEXT I
RXJ 670 DATA 104,104,133,251,104,133,250,104,133,253
PSJ 680 DATA 104,133,252,165,89,133,255,165,88,133
QSJ 690 DATA 254,24,165,250,101,252,133,250,165,251
OPJ 700 DATA 101,253,133,251,162,23,160,39,177,250
OVJ 710 DATA 145,254,136,16,249,24,165,250,105,120
ONJ 720 DATA 133,250,165,251,105,0,133,251,165,254
MRJ 730 DATA 105,40,133,254,165,255,105,0,133,255
TRJ 740 DATA 202,16,219,96
DKJ 750 GRAB$=SHOW$:GRAB$(40,40)=CHR$(254):GRAB$(42,42)=CHR$(250):RETURN
KWJ 760 RESTORE 810
NVJ 770 FOR I=1536 TO 1616:READ N:TOT=TOT+I+N:POKE I,N:NEXT I
WJJ 780 POKE 1547,133:POKE 1557,121:POKE 1582,115
XMJ 790 IF TOT=161532 THEN A=USR(1536):RETURN
BQJ 800 GOTO 900
RZJ 810 DATA 104,162,6,160,10,169,7,76,92,228,174,132,2,240,5,202
CLJ 820 DATA 134,206,240,40,174,120,2,228,203,208,4,165,206,208,29,165
DUJ 830 DATA 207,240,4,198,207,240,21,230,206,134,203,230,207,173,113,2
QMJ 840 DATA 201,1,240,2,162,16,189,63,6,141,252,2,76,98,228,134
VRJ 850 DATA 24,29,27,143,51,53,48,135,31,30,26,50,34,12,14,142,155
LEJ 860 RESTORE 930:I=0:TOT=0
KVJ 870 READ N:IF N=-1 THEN 900
IJJ 880 TOT=TOT+N+1:POKE 1664+I,N:I=I+1
CFJ 890 GOTO 870
IBJ 900 POKE 559,0:POKE 712,0:POKE 710,192:POKE ML,2
UXJ 910 IF TOT<>13247 THEN GRAPHICS 0:PRINT "ERROR - CHECK DATA LINES":END
PNJ 920 FOR I=1767 TO 1790:POKE I,192:NEXT I:A=USR(1664):RETURN
SLJ 930 DATA 104,173,48,2,133,204,173,49,2,133,205,160,26,169,148
TZJ 940 DATA 153,230,6,136,208,250,160,0,177,204,9,128,145,204,160
QUJ 950 DATA 3,177,204,9,128,145,204,160,6,177,204,9,128,145,204
KUJ 960 DATA 200,192,28,208,245,169,197,141,0,2,169,6,141,1,2
QIJ 970 DATA 173,14,212,9,128,141,14,212,96,72,152,72,173,11,212
PUJ 980 DATA 201,7,240,18,201,8,240,14,230,204,164,204,185,231,6
OFJ 990 DATA 141,24,208,104,168,104,64,169,0,133,204,240,238,-1
QXJ 1000 POKE 53250,0:POKE 53251,0:GRAPHICS 0
MVJ 1010 POKE 16,64:POKE 53774,64
CPJ 1020 RETURN
TSJ 1030 XL=X:YL=Y:POKE 559,0:PRINT CLS$:POKE 53248,0:POKE 694,0:POKE 702,64
MFJ 1040 GOSUB 1000:POKE 559,0:A=USR(1664):POKE 752,1:POKE 710,196:TRAP 1370
SPJ 1050 FOR I=1769 TO 1788:POKE I,0:NEXT I:POKE 1755,23
WEJ 1060 POKE 1767,12:POKE 1768,10:POKE 1789,10:POKE 1790,12
TKJ 1070 POSITION 10,0:PRINT "ELECTRONIC  CHECKBOOK"
YBJ 1080 POKE C85,7:PRINT "COPYRIGHT 1987 JEFF BRENNER"
ODJ 1090 A=USR(ADR(INVERSE$),0,0,40):A=USR(ADR(INVERSE$),0,1,40)
YVJ 1100 A=USR(ADR(INVERSE$),0,22,40)
AFJ 1110 POSITION 4,23:PRINT "SELECT FUNCTION AND PRESS START";
VXJ 1120 POSITION 0,0:PRINT CHR$(30);CHR$(31);
QNJ 1130 A=USR(ADR(INVERSE$),4,23,6):A=USR(ADR(INVERSE$),30,23,5)
ZAJ 1140 A=USR(ADR(INVERSE$),0,23,40)
CWJ 1150 POKE 53250,56:POKE 53251,186:POKE 623,1:POKE 53258,1:POKE 53259,1
OTJ 1160 POKE 706,128:POKE 707,128
SAJ 1170 P$(281,360)=DSN$
SOJ 1180 P$(409,488)=DSN$
OZJ 1190 POSITION 14,6:PRINT "WRITE A CHECK":PRINT
NMJ 1200 POKE C85,13:PRINT "ADJUST  ACCOUNT":PRINT
QJJ 1210 POKE C85,7:PRINT "DEFINE OR EDIT CHECK FORMAT":PRINT
QPJ 1220 POKE C85,13:PRINT "SAMPLE PRINTOUT":PRINT
SIJ 1230 POKE C85,12:PRINT "DEFINE/EDIT NAMES":PRINT
CJJ 1240 POKE C85,7:PRINT "SETUP/ENTER ACCOUNT BALANCE"
NGJ 1250 POKE 559,46:POKE 764,255
UAJ 1260 POKE OLD,0:POKE L,12:SOUND 0,0,0,0:SOUND 1,0,0,0
EEJ 1270 SOUND 2,0,0,0:IF FL=0 THEN C=PEEK(53279):IF C<5 OR C>6 THEN 1270
UAJ 1280 IF C=6 THEN 1350
RSJ 1290 SOUND 0,17,12,8
XVJ 1300 DL=0:OLD=L:L=L+2:IF L>1783 THEN L=1773
OGJ 1310 IF FL=0 AND PEEK(53279)=C THEN DL=DL+1:IF DL<12 THEN 1310
TCJ 1320 FL=1
VVJ 1330 IF PEEK(53279)<>C THEN FL=0
FIJ 1340 GOTO 1260
QBJ 1350 LL=(L-1771)/2:POKE 764,255
FTJ 1360 GOTO 1890
SKJ 1370 POKE 559,0:PRINT CLS$:FOR I=1767 TO 1790:POKE I,0:NEXT I
OQJ 1380 POKE 710,198:POKE 752,1:POKE 53248,0
FSJ 1390 POSITION 9,6:PRINT "ERROR #";PEEK(195);" AT LINE ";
BBJ 1400 PRINT PEEK(187)*256+PEEK(186)
JOJ 1410 PRINT :POKE C85,9:I=PEEK(C84):PRINT "PRESS RETURN FOR MENU"
FLJ 1420 A=USR(ADR(INVERSE$),15,I,6):POKE 764,255:POKE 559,46
QVJ 1430 IF PEEK(SK)<>12 THEN 1430
DKJ 1440 TRAP 1370:GOTO 1030
RSJ 1450 IN=INT(IN*100+0.5)/100:NN=INT(IN):DD=NN:NN$=STR$(NN):LMT=0:SKIP=0
BRJ 1460 IF NN=0 THEN TXT$="ZERO":TXT$(5,5)=SP1$:GOTO 1770
ORJ 1470 IF NN<10 THEN GOSUB 1740:GOTO 1770
QPJ 1480 IF NN<100 THEN GOSUB 1660:GOTO 1770
CRJ 1490 IF NN>=1000*1000*1000 THEN TXT$="OVERFLOW":RETURN
LMJ 1500 IF LEN(NN$)>LMT*3 THEN LMT=LMT+1:GOTO 1500
NPJ 1510 A$="000":IF LMT*3=LEN(NN$) THEN 1530
NOJ 1520 A$=A$(1,LMT*3-LEN(NN$)):A$(LEN(A$)+1)=NN$:NN$=A$
IOJ 1530 LMT=LMT-1
TNJ 1540 A$=NN$(1,3):IF LEN(NN$)>3 THEN NN$=NN$(4,LEN(NN$)):GOTO 1560
ETJ 1550 NN$=NUL$
KXJ 1560 IF A$="000" THEN SKIP=1
YAJ 1570 RESTORE 1850:IF VAL(A$(1,1))=0 THEN 1610
DIJ 1580 FOR I=1 TO VAL(A$(1,1)):READ TMP$:NEXT I
SIJ 1590 TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)=SP1$
FBJ 1600 TXT$(LEN(TXT$)+1)="HUNDRED":TXT$(LEN(TXT$)+1)=SP1$
RLJ 1610 DD=VAL(A$(2,3)):GOSUB 1660
BMJ 1620 IF LMT=0 THEN 1770
UOJ 1630 RESTORE 1880:FOR I=1 TO LMT:READ TMP$:NEXT I
FEJ 1640 IF SKIP=0 THEN TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)=SP1$
XWJ 1650 SKIP=0:GOTO 1530
YUJ 1660 IF DD>19 THEN 1710
YNJ 1670 IF DD<10 THEN 1740
WSJ 1680 IF DD=0 THEN 1830
XGJ 1690 RESTORE 1850:FOR I=1 TO DD:READ TMP$
HHJ 1700 NEXT I:TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)=SP1$:RETURN
MXJ 1710 RESTORE 1870:FOR I=1 TO INT(DD/10)-1:READ TMP$:NEXT I
MYJ 1720 TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)="-"
ASJ 1730 DD=DD-INT(DD/10)*10:GOTO 1680
WPJ 1740 IF DD=0 THEN 1830
QRJ 1750 RESTORE 1850:FOR I=1 TO DD:READ TMP$:NEXT I
NZJ 1760 TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)=SP1$:RETURN
RRJ 1770 DD=IN-INT(IN)
SLJ 1780 TXT$(LEN(TXT$)+1)="AND":TXT$(LEN(TXT$)+1)=SP1$
HNJ 1790 IF DD=0 THEN TMP$="00":GOTO 1810
BWJ 1800 TMP$=STR$(DD):TMP$(LEN(TMP$)+1)="00":TMP$=TMP$(3,4)
SPJ 1810 TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)="/100"
HVJ 1820 TXT$(LEN(TXT$)+1)=SP1$:RETURN
XLJ 1830 IF TXT$(LEN(TXT$))="-" THEN TXT$(LEN(TXT$))=SP1$
CZJ 1840 RETURN
PRJ 1850 DATA ONE,TWO,THREE,FOUR,FIVE,SIX,SEVEN,EIGHT,NINE,TEN,ELEVEN,TWELVE
QNJ 1860 DATA THIRTEEN,FOURTEEN,FIFTEEN,SIXTEEN,SEVENTEEN,EIGHTEEN,NINETEEN
YRJ 1870 DATA TWENTY,THIRTY,FORTY,FIFTY,SIXTY,SEVENTY,EIGHTY,NINETY
RNJ 1880 DATA THOUSAND,MILLION
SRJ 1890 POKE 559,0:PRINT CLS$:FOR I=1767 TO 1790:POKE I,0:NEXT I
OOJ 1900 POKE 710,198:POKE 752,1:POKE 53248,0
LUJ 1910 POSITION 13,6:PRINT "NOT AVAILABLE YET";
FZZ 1920 GOTO 1410
```

NUMBER TO ENGLISH CONVERTER

```
OTJ 10 REM NUMBER TO ENGLISH CONVERTER
KHJ 20 REM COPYRIGHT 1987 JEFF BRENNER
WAJ 30 DIM TXT$(130),NN$(130),TMP$(130),A$(130),SP1$(1),NUL$(1)
MJJ 40 GRAPHICS 0:SP1$=CHR$(32)
SZJ 50 PRINT "ENTER A NUMBER: ";:TXT$=NUL$
KOJ 60 INPUT #16;IN
CEJ 70 GOSUB 100
IJJ 80 PRINT TXT$
KHJ 90 PRINT :PRINT :GOTO 50
PNJ 100 IN=INT(IN*100+0.5)/100:NN=INT(IN):DD=NN:NN$=STR$(NN):LMT=0:SKIP=0
WHJ 110 IF NN=0 THEN TXT$="ZERO":TXT$(5,5)=SP1$:GOTO 420
ILJ 120 IF NN<10 THEN GOSUB 390:GOTO 420
KAJ 130 IF NN<100 THEN GOSUB 310:GOTO 420
AMJ 140 IF NN>=1000*1000*1000 THEN TXT$="OVERFLOW":RETURN
HUJ 150 IF LEN(NN$)>LMT*3 THEN LMT=LMT+1:GOTO 150
JXJ 160 A$="000":IF LMT*3=LEN(NN$) THEN 180
LSJ 170 A$=A$(1,LMT*3-LEN(NN$)):A$(LEN(A$)+1)=NN$:NN$=A$
GSJ 180 LMT=LMT-1
PMJ 190 A$=NN$(1,3):IF LEN(NN$)>3 THEN NN$=NN$(4,LEN(NN$)):GOTO 210
COJ 200 NN$=NUL$
ISJ 210 IF A$="000" THEN SKIP=1
RUJ 220 RESTORE 500:IF VAL(A$(1,1))=0 THEN 260
BDJ 230 FOR I=1 TO VAL(A$(1,1)):READ TMP$:NEXT I
QDJ 240 TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)=SP1$
DFJ 250 TXT$(LEN(TXT$)+1)="HUNDRED":TXT$(LEN(TXT$)+1)=SP1$
NKJ 260 DD=VAL(A$(2,3)):GOSUB 310
WLJ 270 IF LMT=0 THEN 420
QNJ 280 RESTORE 530:FOR I=1 TO LMT:READ TMP$:NEXT I
DIJ 290 IF SKIP=0 THEN TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)=SP1$
TVJ 300 SKIP=0:GOTO 180
UTJ 310 IF DD>19 THEN 360
UMJ 320 IF DD<10 THEN 390
SRJ 330 IF DD=0 THEN 480
SWJ 340 RESTORE 500:FOR I=1 TO DD:READ TMP$
FLJ 350 NEXT I:TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)=SP1$:RETURN
IWJ 360 RESTORE 520:FOR I=1 TO INT(DD/10)-1:READ TMP$:NEXT I
LCJ 370 TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)="-"
VRJ 380 DD=DD-INT(DD/10)*10:GOTO 330
SXJ 390 IF DD=0 THEN 480
MHJ 400 RESTORE 500:FOR I=1 TO DD:READ TMP$:NEXT I
LUJ 410 TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)=SP1$:RETURN
PMJ 420 DD=IN-INT(IN)
QGJ 430 TXT$(LEN(TXT$)+1)="AND":TXT$(LEN(TXT$)+1)=SP1$
DMJ 440 IF DD=0 THEN TMP$="00":GOTO 460
ZAJ 450 TMP$=STR$(DD):TMP$(LEN(TMP$)+1)="00":TMP$=TMP$(3,4)
QTJ 460 TXT$(LEN(TXT$)+1)=TMP$:TXT$(LEN(TXT$)+1)="/100"
FZJ 470 TXT$(LEN(TXT$)+1)=SP1$:RETURN
VPJ 480 IF TXT$(LEN(TXT$))="-" THEN TXT$(LEN(TXT$))=SP1$
BDJ 490 RETURN
NMJ 500 DATA ONE,TWO,THREE,FOUR,FIVE,SIX,SEVEN,EIGHT,NINE,TEN,ELEVEN,TWELVE
OIJ 510 DATA THIRTEEN,FOURTEEN,FIFTEEN,SIXTEEN,SEVENTEEN,EIGHTEEN,NINETEEN
WMJ 520 DATA TWENTY,THIRTY,FORTY,FIFTY,SIXTY,SEVENTY,EIGHTY,NINETY
PYZ 530 DATA THOUSAND,MILLION
```

ComputerEyes

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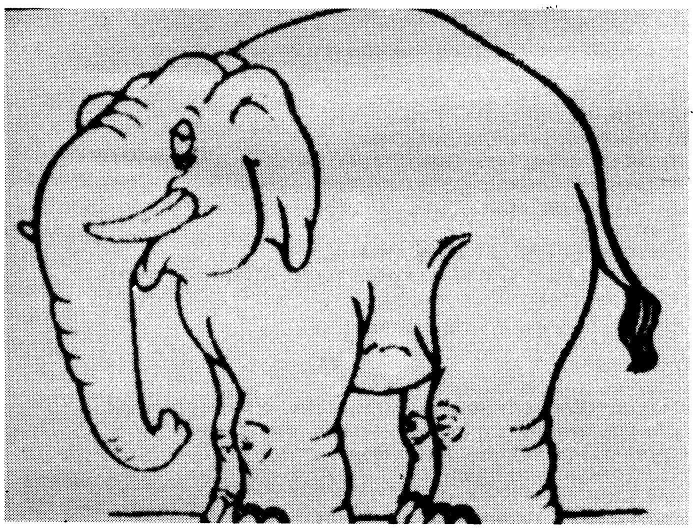
screen using the current settings of the control panel. After you capture an image, you can modify its appearance by adjusting the brightness and contrast sliders, the gray levels setting, the red, green, and blue sliders (for color images) and number of colors option (also for color images). After you make a change to any of these settings, simply click on the "adjust" button to display the result. You can cancel the repainting of the screen before the process is complete by pressing the right mouse button.



If you are adjusting a color image, the system takes a few seconds after you click on "adjust" to analyze the image, in the process automatically determining the color palette it will use to paint it. It is important to understand that "adjust" recalculates the palette and the value at every screen pixel location from a large table of raw image data created by performing a capture. This means that you can readjust the appearance of the image as many times as you want without losing the original image data. The image is not rescanned unless you click once again on the "capture" button. This is a very powerful approach and allows you to optimize the characteristics of every image that you capture.

If you load an image from disk, it cannot be adjusted as a freshly captured image can. This is because it is a Degas or NEOchrome picture file, and does not consist of raw image data as created by performing a capture. The "adjust" button and slider controls are in fact disabled when you load an image from disk; they are only enabled after you capture an image. Unfortunately, raw data sets themselves cannot be saved to disk.

The "whtbal" (white balance) button is provided as a means of initially setting the red, green, and blue sliders to settings that will give generally a realistic color balance. It is like using the white balance adjustment button on a color video camera. To use it, provide a video output as close to white as possible by using a white translucent lens cap or by aiming the camera at a white object, such as a sheet of paper. Then click on the "whtbal" button. This causes the system to spend a few seconds analyzing the content of your video signal. When it's done, it will automatically update the settings of the red, green, and blue sliders to the appropriate values.

If you capture an image before doing a white balance, the system will calculate RGB settings based upon the actual image. This may result in an image with unbalanced color content, but it will definitely be displayable. You can always do a white balance even after the image is captured, or adjust the R, G, and B sliders manually, and click on "adjust" to redisplay the image.

If you are not using a video camera and instead are capturing images directly from a videotape recorder, the "whtbal" button won't really be of any benefit. Rather, just let the system calculate RGB values and readjust them manually as you see fit.

There is no "whtbal" button on the monochrome control panel, since the balance of red, green, and blue is unimportant in monochrome images. Also, if you are capturing images in either the 2, 4, 8, or 16 level gray scale modes (as opposed to color), the RGB settings are entirely disabled.

The resolution area is a pair of buttons that allow you to select the resolution (lo-res or mid-res) of the image that you're about to capture. It has no effect on images you've already captured. Lo-res images consist of 320 pixels horizontally by 200 pixels vertically; each pixel can take on one of up to sixteen colors or intensity levels. Mid-res images consist of 640 pixels horizontally by 200 pixels vertically; each pixel can take on one of up to four colors or intensity levels. It takes twice as long to capture a mid-res image as a lo-res image, since there are twice as many pixels to scan.

Normally, it requires six seconds to capture a lo-res image or twelve seconds for a mid-res. However, if you wish, you can choose a slower scan rate (twelve seconds for lo-res or 24 seconds for mid-res) to produce images with somewhat better resolution. The reason for this is rather technical, and has to do with the interlace characteristics of composite video signals. Essentially, you're given the choice of trading off capture time against a certain improvement in image quality. This improvement can be most readily noticed as somewhat less jaggedness along lines in images that are close to horizontal.

The brightness and contrast sliders work exactly like their counterpart controls on a television set. Increasing the brightness slider produces an image with higher intensities. Increasing the contrast yields an image with greater differences between light and dark areas.

There is a small button located near the brightness and contrast sliders labeled "rst" (for "restore"). If you click on this button, you will restore the brightness and contrast buttons to their original values as calculated by the system when

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Public Domain

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Transformer. "Xanth [remember Boink!?] was interested enough in the market potential of the Transformer that they lent me hardware to aid in the development," says Mihocka, "but they let me know that they were not interested in any potential problems with Atari."

We don't know what might finally be worked out by Atari and Mihocka, if anything. Meanwhile, the interest in an emulator is peaking throughout Atari users. Despite Darek's attempts to keep the original version from being distributed (as Atari demanded), it and later versions are being openly traded on many BBSs around the country. There are some boards that have even formalized entire message bases and download collections dedicated to software that has been tested and proven to work on the emulator. I get notes on my BBS every day (from all over the country) asking "Can't you just send one copy to...." Keep in mind that this is the product that Atari and Compuserve observers agreed that there was "no interest" in. It is certain that Darek is getting some of the notoriety he deserves by all this. "That's what I need most, as I can't stay in college forever... and I will need a job!" says Mihocka.

We all thought is was unfortunate (and even Atari seemed to agree when Apple was uncooperative about ROMS for the Magic-Sac Macintosh emulator. Now the shoe is on Atari's own other foot and they are being just as difficult. "We must protect our property," said Atari's Frick, "If we release our code for this project, it is released to everyone for anything."

Darek tells me he will either get some satisfaction out of Atari regarding actual development and release of his or any emulator, or he plans to release a "complete" version of his own (minus the Atari infringements somehow) by this summer. "Anyone having any suggestions on the program or the legal questions can reach me on Compuserve—Darek Mihocka (CIS 73657,2714)"

If you are of such a mind, you might write to Jack Tramiel or Richard Frick and tell them that one way or another, you want that thing so many of us have been waiting for—a way to avoid losing all our hard-earned software when we buy the Atari ST. ●

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ComputerEyes
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the image was captured. This is handy for getting back to "ground zero" after fooling around with an image for a while.

The red, green, and blue sliders are provided to let you modify the color content of the image that you capture. This can be either to fine-tune the color balance for the most realistic results, or to modify the balance to achieve special effects. Unlike the brightness and contrast sliders, the R, G, and B sliders are not changed each time you perform a capture. This is because although it is correct to change the brightness and contrast settings to compensate for lighting and other conditions, you would not want to change the color balance once you've gotten it adjusted correctly (as with a white balance).

It will probably take a little practice before you get the feel of what the effects of particular R, G, and B slider changes are. For example, it is not necessarily intuitive that increasing both red and green makes an image appear more yellow. As the raw capture data remains in RAM memory, it does no harm to experiment with various changes to see what the effects are.

The gray levels area gives you dramatic control over the color palette used to display images that you capture. Note that by capturing an image, which results in a large table of raw image data, you can change the gray levels (or color) as often as you wish and redisplay the same image in several different modes. When you are happy with the way an image appears, you can then save it to disk with the palette and screen pixel values as they last appeared. Here are descriptions of the various gray levels options:

2—Only two palette colors are assigned, namely black and white. Essentially, every point in the image is determined to be either above or below a certain threshold, and the image is displayed entirely as areas of black and white. If you increase the brightness slider setting, more of the image will appear white, and vice versa. The contrast and red, green, and blue sliders are disabled, since they have no effect on the appearance of the image. This type of image is ideal for line drawings, logos, and other applications where the image being digitized already has a lot of contrast.

4—Four palette colors are assigned, namely black, dark gray, light gray, and white. The brightness and contrast sliders can both be used to modify the appearance of the image. The red, green, and blue sliders are disabled.

8—Eight palette colors are assigned, namely all eight of the pure gray intensity levels of which the ST is capable of ranging between black and white. The brightness and contrast are enabled, RGB sliders disabled. This entire selection is disabled in mid-res, since only four palette values are supported by the ST in this mode.

16—Sixteen palette colors are assigned. These consist of all eight of the pure gray intensity levels of which the ST is capable, plus an additional color between each gray level obtained by increasing either the R, G, or B value by one. The result is a sixteen level monochrome image with a distinctive tint. Either red, green, or blue can be used to tint the image. Brightness and contrast are enabled, RGB sliders disabled.

COLOR—Up to sixteen palette colors are assigned (four in mid-res). You can choose to use less colors, saving one or two for your own use, or for special effects. The ComputerEyes software uses a sophisticated "voting" technique that determines the palette based on the color content of the raw image data and the settings of the various slider controls. The brightness, contrast, and red, green, and blue sliders can all be used to modify the appearance of the image. As opposed to color digitizers that require three passes of a monochrome scan under red, blue, and green filters, ComputerEyes does it all, in full color, in a single scan (if you have provided a color input).

Another color setting, separation, is also extremely handy for dealing with color input. For purposes of example, let's imagine scanning an American Flag. This video input consists of exactly three colors, and so we set the number of colors to three. Then, in order to clarify the scan, we will push the separation setting. The higher the separation setting, the more ComputerEyes will ignore colors that are close to each other, skipping onto colors with more differences between them. Experimentation with the separation setting will result in superior images.

For the most part, the description above applies to the monochrome monitor version of ComputerEyes as well. The monochrome control panel contains a relevant subset of the color panel. Monochrome images have a resolution of 640 x 400 pixels; each pixel may be either on or off (white or black). There are two ComputerEyes scanning modes:

NORMAL—This is a very high contrast mode, similar to what is obtained by setting gray levels to "2" in the color control panel. Every point in the image is determined to be above or below a certain threshold, with the resulting image being composed of solid areas of black and white. Due to the high resolution of the ST when used with the monochrome monitor, this capture mode yields images of exceptional clarity and sharpness. It is excellent for capturing images such as line drawings, font sets, etc. Because there are so many pixels to be scanned, the normal capture mode takes about 24 seconds to perform. The brightness control is enabled in this mode, while the contrast control is not.

DITHER—The dither mode is the means by which images with gray tones can be represented on the monochrome monitor. Here, gray levels are represented as varying dot intensities. The term "dither" refers to the technique that is used to determine the patterns of dots used to form the gray levels. Because there is a slight smearing effect inherent in the dithering process anyway, a six-second scan is used without loss of image quality. Brightness and contrast sliders are active in this mode.

As a graphics tool, ComputerEyes is superlative. Our experimentation with the device resulted in excellent scans in all resolutions, especially 16-shade tinted mode. Our experience with color was less impressive, but that may have more to do with the inadequacy of our lighting conditions than anything else. It is unfortunate that the raw video data set cannot be saved to disk, as is possible with Thunderscan for the Macintosh. But to be fair, MacVision from Koala Technologies—the equivalent video digitizer for the Mac—is blown away by the capabilities of this package. ComputerEyes packs a lot of power into a little package, at a list price of $249.95. This may seem like a lot, but it is actually extremely reasonable for the features it provides.

ComputerEyes software is not copy-protected, and it requires TOS in ROM. For more information, contact Digital Vision, 66 Eastern Avenue, Dedham, MA 02026; (617) 329-5400. ●

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ProA/D—GEM-based Program

Reviewed by Robert Westcott

ProA/D is a GEM-based amortization and depreciation program for the Atari ST recently released by Mountain Magic Software.

Who needs an amortization and depreciation program? Anyone in business who would rather pay themselves than a C.P.A., and homeowners like myself who got their house when mortgage rates were high and are now thinking about refinancing.

To see how the program worked in a real-life situation I ran an amortization table on my current mortgage (which came out the same as the one done by the Title Company's C.P.A. firm), and then, after calling a few local financial institutions for their current mortgage rates, ran tables for those. The whole endeavor took me less than a half hour, and I found out that not only did I have a piece of useful and easy-to-use software, but I could be saving about a hundred and fifty bucks on my house payments by refinancing.

Yes, I could have gone to my local C.P.A. and found out the same thing, but it would have taken me longer and cost a couple of c-notes to boot!

As Jack Tramiel would say, by using my ST and ProA/D, I got the power without the price!

ProA/D comes on a non-copy-protected disk, with documentation on the disk.

Personally, I try to avoid copy-protected programs, working off working copies of my programs and keeping my originals in a safe place. I've had the experience of a glitch in my electrical line eating a disk, and I, for one, can't afford to wait two weeks for a replacement disk, and despise parting with $10 to $25 for a backup.

As to the documentation, it's concise and yet sufficient. For that matter, with just a little trial-and-error, you can figure out the program without the documentation.

ProA/D, as the name implies, computes both amortization and depreciation.

In the Amortization mode, it can be used to calculate the amount of periodical payment (in which case you supply the amount of the loan, the interest rate, the term of the loan, and the date of the first payment), or the approximate number of years of loan term (in which case you supply the amount of the loan, the interest rate, and the desired amount of payment).

The first scenario is useful when, like myself, you are contemplating refinancing, or are comparing interest rates. Another nice feature (though not as useful since the Tax Reform Act) is that in this mode, the printout contains a yearly totalization of interest paid and principal paid off. My C.P.A. asks for these figures at tax time, and by me supplying him the figures rather than him having to compute them, I save money.

The second scenario is useful when figuring if a house (or yacht, for that matter) is within your reach. If it takes 100 years to pay off, you probably have a problem.

Now, let's say you're like me and want to use the program to figure how much you would save by refinancing your house at a lower interest rate. You've done your homework regarding closing costs and the like and you've found you can get a loan today at 8 percent. Let's say you need $50,000.00 to pay off the old mortgage and the closing costs for the new one.

You load ProA/D into your RAMDISK and click the pointer on the PROAD icon. Immediately a window appears and you are asked for the name and address of your firm (this is nice if you're a C.P.A., and makes you feel important if you're not). You complete

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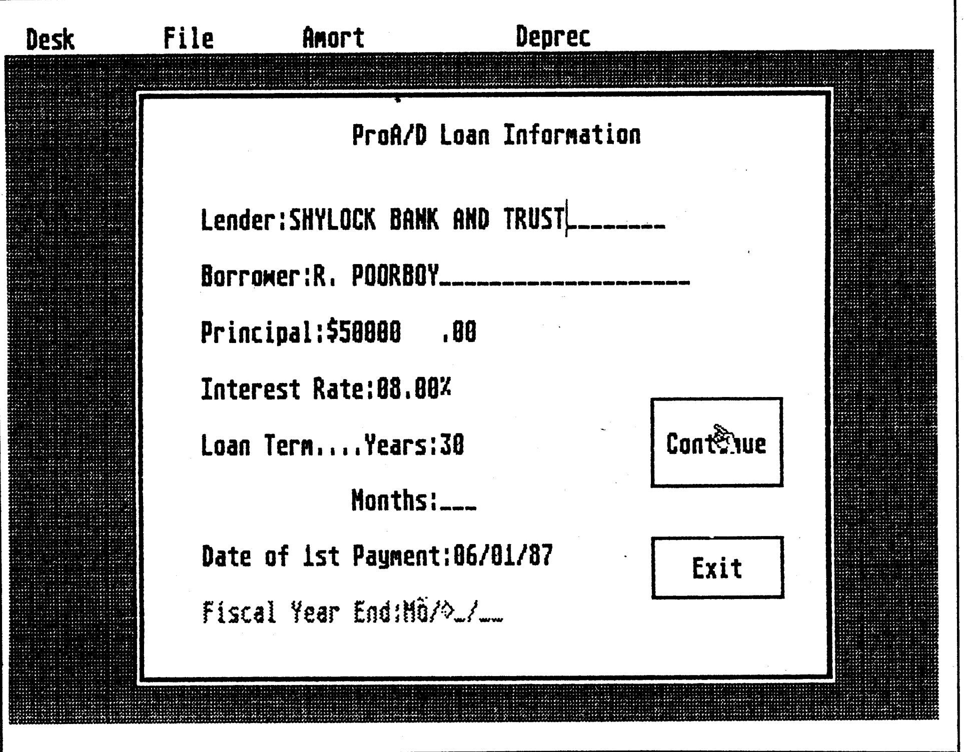


ProA/D Loan Information

Lender:SHYLOCK BANK AND TRUST

Borrower:R. POORBOY

Principal:$50000 .00

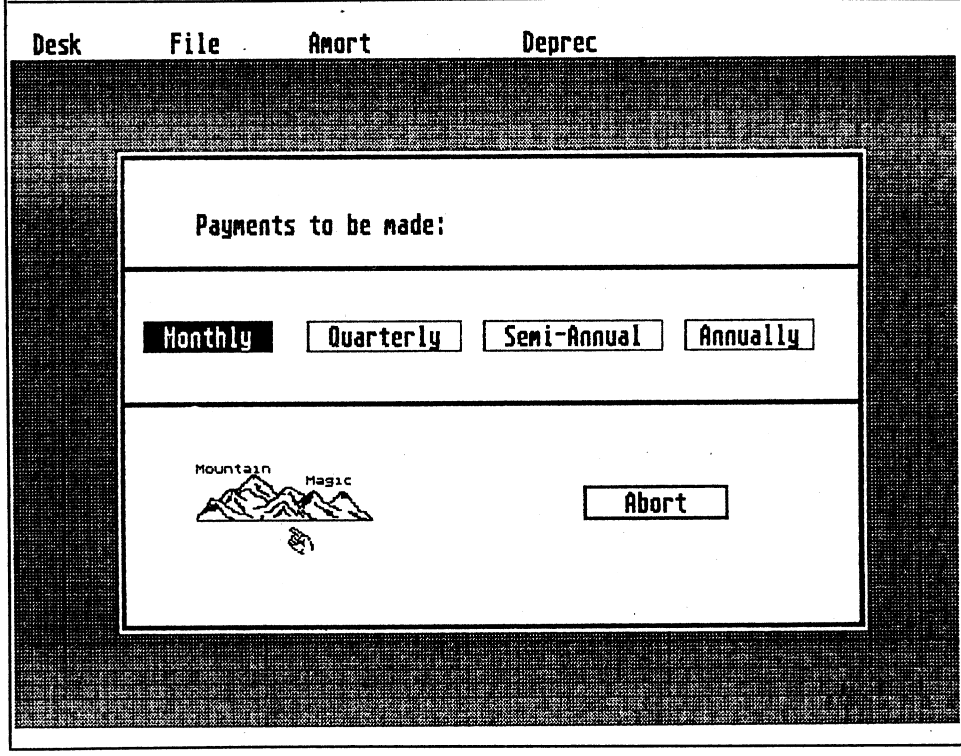
Interest Rate:08.00%

Loan Term....Years:30

Months:

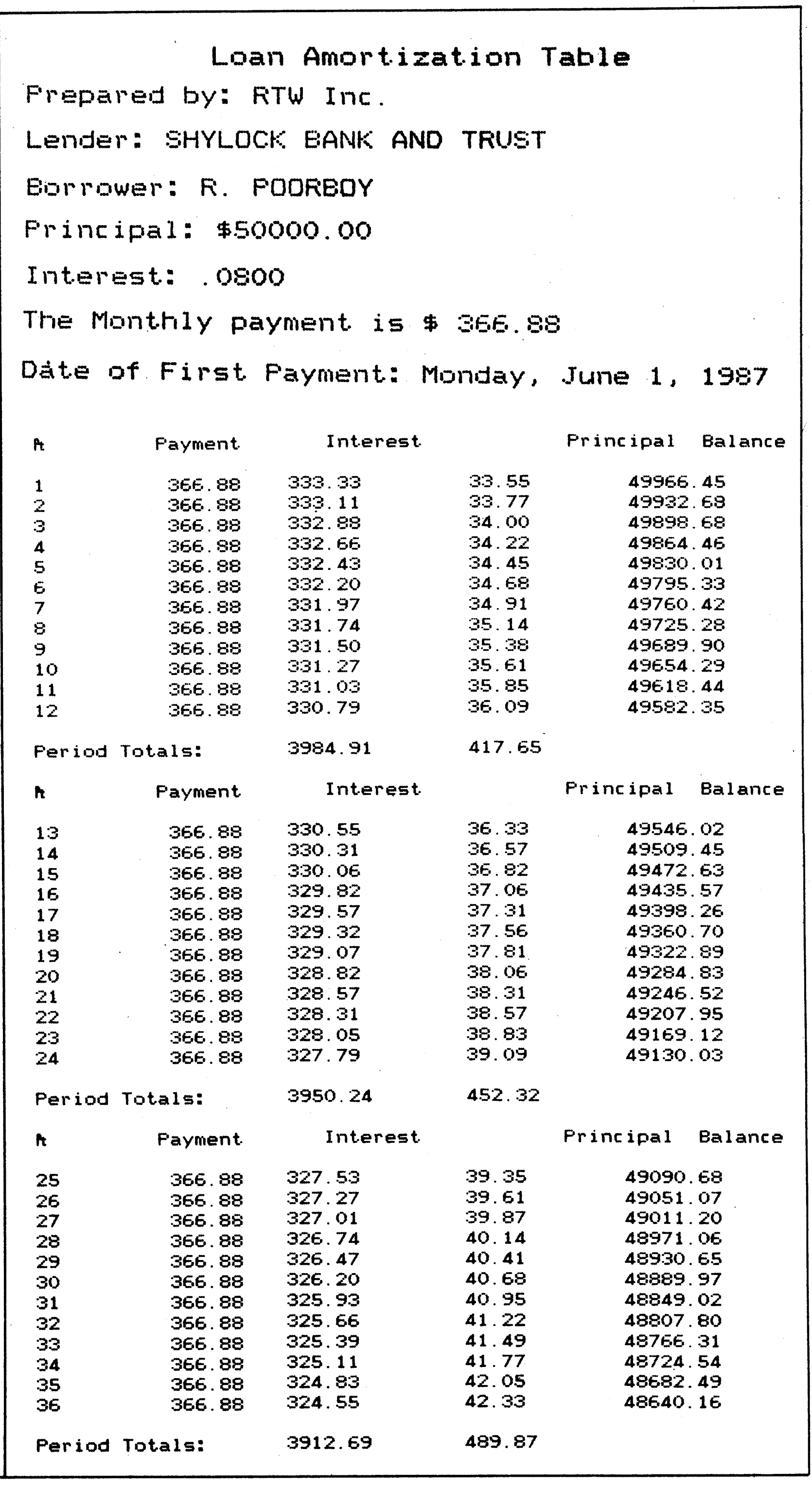
Date of 1st Payment:06/01/87

Fiscal Year End:MO/__/__



Payments to be made:

[✓ Monthly] Quarterly Semi-Annual Annually



```
                  Loan Amortization Table
Prepared by: RTW Inc.
Lender: SHYLOCK BANK AND TRUST
Borrower: R. POORBOY
Principal: $50000.00
Interest: .0800
The Monthly payment is $ 366.88
Date of First Payment: Monday, June 1, 1987

 #         Payment      Interest              Principal  Balance

 1          366.88   333.33          33.55          49966.45
 2          366.88   333.11          33.77          49932.68
 3          366.88   332.88          34.00          49898.68
 4          366.88   332.66          34.22          49864.46
 5          366.88   332.43          34.45          49830.01
 6          366.88   332.20          34.68          49795.33
 7          366.88   331.97          34.91          49760.42
 8          366.88   331.74          35.14          49725.28
 9          366.88   331.50          35.38          49689.90
 10         366.88   331.27          35.61          49654.29
 11         366.88   331.03          35.85          49618.44
 12         366.88   330.79          36.09          49582.35

 Period Totals:      3984.91         417.65

 #         Payment      Interest              Principal  Balance

 13         366.88   330.55          36.33          49546.02
 14         366.88   330.31          36.57          49509.45
 15         366.88   330.06          36.82          49472.63
 16         366.88   329.82          37.06          49435.57
 17         366.88   329.57          37.31          49398.26
 18         366.88   329.32          37.56          49360.70
 19         366.88   329.07          37.81          49322.89
 20         366.88   328.82          38.06          49284.83
 21         366.88   328.57          38.31          49246.52
 22         366.88   328.31          38.57          49207.95
 23         366.88   328.05          38.83          49169.12
 24         366.88   327.79          39.09          49130.03

 Period Totals:      3950.24         452.32

 #         Payment      Interest              Principal  Balance

 25         366.88   327.53          39.35          49090.68
 26         366.88   327.27          39.61          49051.07
 27         366.88   327.01          39.87          49011.20
 28         366.88   326.74          40.14          48971.06
 29         366.88   326.47          40.41          48930.65
 30         366.88   326.20          40.68          48889.97
 31         366.88   325.93          40.95          48849.02
 32         366.88   325.66          41.22          48807.80
 33         366.88   325.39          41.49          48766.31
 34         366.88   325.11          41.77          48724.54
 35         366.88   324.83          42.05          48682.49
 36         366.88   324.55          42.33          48640.16

 Period Totals:      3912.69         489.87
```

Hacking The ST

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is also byte reversed, swap the low and high byte position before trying to figure out the number.) Clusters will be discussed shortly.

The last 4 bytes of a directory entry are the size of the file. Again, these are byte reversed. The file size is given in bytes. A re-cap of the directory entry contents are given in Table 3 on page 333.

What is a cluster? If you look at the number of sectors on the disk, you will see that there are (9 sectors/track * 80 tracks) 720 sectors. That means that the sectors would be numbered from 0 to 719, and it would take 10 bits to identify each sector. On a double-sided drive, there are 1440 sectors and it takes 11 bits to identify each sector. So far, no problem, but hard drives are another story.

There is a trade-off made between the size of the disk area allocated and the average amount of disk space wasted. This occurs because the system needs to know where data from a particular file is located, and so it is easiest to allocate a sector or sectors for the file, but the file may not fill the complete sector.

When a file does not fill the complete space allocated to it, the unused portion is wasted space. To keep down the amount of wasted space, you would like to allocate disk space in the smallest amount practical. The other side of the coin so to speak is that the system has to have a way of tracking which pieces of the disk belong to which file.

In order to track which piece of the disk belongs with a file, the system needs a way to uniquely identify each sector, and so it numbers each one. Larger numbers require more storage space and this space is system overhead, and cannot be used to store data. It is important to keep this size down, because the system keeps the FAT of each disk in memory. If you have 4 drives, the FAT storage can eat up quite a bit of system RAM, a resource that we always like to save for the application programs.

To keep the system overhead down, you want to divide the disk space into a small number of pieces so that they can be identified with a small number of bits. If the disk is divided into a small number of pieces, it follows that each piece would be large.

In the end, you have to make a trade-off between small allocated size (to reduce waste due to unfilled space) and large allocated size (to reduce the system overhead of allocated space numbering). On the ST, disk space is allocated in 1K byte chunks called clusters. There are 2 sectors per cluster.

With this allocation scheme, there are 360 clusters on the disk, but not all of them are used for data storage, (remember the two FATs, the boot sector and the root directory?). The single-sided drive has 9 clusters tied up with the system information, (2 tracks = 18 sectors) so we have 351 clusters that can be used for data storage.

The file allocation on the SF354 (and SF314) drives uses a linked format. The basic operation is fairly simple, the directory entry contains the first FAT entry number used by the file. As an example, let's assume that the file is 8 sectors long, or 4 clusters. Let's also assume the link for this file is 4.

If we look at FAT entry number 4, we see that it contains a 5. FAT entry 5 contains a 6, FAT 6 contains a 7, and FAT 7 contains 4095. Each FAT entry corresponds with a cluster on the disk. The original link was 4, and the first cluster of the file is cluster 4. When we look at FAT entry 4, it has a 5 in it. The five tells us that the second cluster used by the file is cluster 5, and it also tells us to look at FAT entry 5 to find the next cluster.

The FAT entries form a linked list that also specify the cluster allocation for the file. The system uses FFF (4095) to indicate the end of the list. In the example presented here, the file occupied consecutive clusters, but this is not true for all files. As files are created and then erased, fragmentation of the disk space occurs, and eventually new files get a cluster here and a cluster there, and are no longer sequential.

The system uses several special values to indicate the status of certain clusters. Already mentioned was the terminating value FFF which indicates the end of the linked list. Any value from FF8 to FFF can serve as the termination indication. The system also uses the value 000 to indicate that a cluster (and the FAT entry) is free. Unused clusters have 000 in their FAT entries. If a cluster is unusable, the FAT for that cluster will contain a number between FF0 and FF7, (bad sectors on the disk are locked out this way when they are encountered during disk formatting).

While in principle the operation of the FAT table seems simple enough, the problem comes in when you look at the disk with a sector editor and try to trace a file. The FAT entries are 12 bits each, so it takes 1.5 bytes to make up a FAT entry. To make matters worse, the values are stored in byte reversed format! To get a pair of FAT entries, you need to start with 3 bytes from the FAT.

The first two FAT entries are system entries. The first FAT entry indicates the disk

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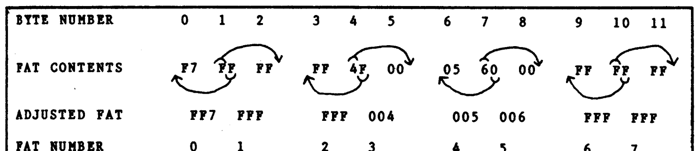
	Track number	Sector number
Boot sector	0	1
FAT 1	0	2
	0	3
	0	4
	0	5
	0	6
FAT 2	0	7
	0	8
	0	9
	1	1
	1	2
Root directory	1	3
	1	4
	1	5
	1	6
	1	7
	1	8
	1	9
Data area	2	1
	.	.
	.	.
	.	.
	79	9

Figure 2.

SF354 Disk map.



BYTE NUMBER	0	1	2	3	4	5	6	7	8	9	10	11
FAT CONTENTS	F7	FF	FF	FF	4F	00	05	60	00	FF	FF	FF
ADJUSTED FAT	FF7	FFF		FFF	004		005	006		FFF	FFF	
FAT NUMBER	0	1		2	3		4	5		6	7	

Figure 1. FAT entry decoding.

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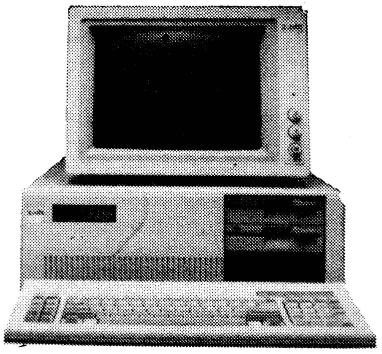

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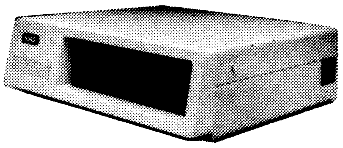

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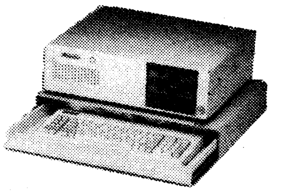

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Pro A/D

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and/or Tab through this window, click the mouse while the arrow is over "Complete" and Voila!, you're into the program.

On your screen are four menu headings. The ever-present Desk heading gives you the option of seeing the version of the program you're running, plus access to any accessories you might have booted up. I suggest you use Control Panel and one of the Calculator accessories, and avoid booting up Thunder, because for some strange reason, Thunder will bomb this software!

The File heading is really a misnomer, being instead the menu column where you exit the program. That becomes rather obvious when you see the only dropdown is the word "Quit."

Next is the Amort column, from which we will select "Amount – >Payment." In case the suspense is killing you the fourth column is "Deprec," which is whence you start depreciation tables.

Clicking on "Amount – > Payment," we once more face one of those fill-in-the-blanks data windows, this one asking for the name of the Lender and Borrower, the Principal, the Interest Rate, the Loan Term (years and/or months), and the date of the first payment. Clicking on "Continue" in the window takes us to the next step.

Our next window asks for the frequency of payments desired, and after we blacken our choice with a click of the rodent, we click on a mountain icon (nice touch for a software company named Mountain Magic), and we're off and running—almost.

One more window appears, asking if you want a Balloon option (again, the programmer got artistic and put some balloons in the window). You click on Continue if you want balloons or Ignore if you want Plain Jane payments. I hit ignore, because I'm lousy at saving up for Balloon payments.

Now I get my results in concise form. All the data inputs appear and with them what I was looking for, the amount of the monthly payments. In the case of fifty grand for thirty years at eight percent, the payments work out to be $366.48 per month.

I now have the option of printing out a complete Amortization table for the thirty years (either to Printer or Screen), or doing something else. It should be noted that the printer printout differs from the screen printout in that the video output does not include yearly totals for principal and interest paid, while the paper product does. One glitch I have to mention is that with my Seikosha SP-1000A printer, the headings for Principal and Balance didn't line up exactly with their numerical columns. I spoke to the Programmer, John Adams, about this, and he said he had never experienced this problem with the two printers he had tried the program out on, a Gemini 10-X and an Okimate 20. In any case, this is a minor, cosmetic problem.

Regarding depreciation, ProA/D supports Straight Line, Double Declining, Sum of Years, and Accelerated Cost Recovery System conventions.

To understand the use of Depreciation Tables, I consulted with a local businessman who formerly was C.E.O. of a pharmaceutical firm and now is a real estate broker. This man knows how to make and retain money, and has to be aware of the ever-changing rules of the game.

To put the whole matter succinctly, the rules of the game changed so dramatically last year with the Tax Reform Act of 1986, that the Depreciation part of this program, and any program of the genre written before the Tax Reform Act is obsolete, and can be misleading.

Double Declining Depreciation has gone the way of the dinosaur and the Statue of Liberty football play, and the rules have changed in a myriad of other ways.

While this is meant to be a product review by a fellow consumer and not a financial column by an expert, let me fill you in on a few of the changes that do limit the use of this and other programs of its type and date.

First, as I understand it, straight-line is the only accepted convention for depreciation on items purchased after January 1, 1987. ProA/D offers straight-line as an option, and thus can still be used to calculate depreciation.

Secondly, the number of years for depreciating assets of various types have changed. Residential real estate, which used to be depreciated over nineteen years (using the formula: value of property minus value of land divided by number of years), now must be depreciated over twenty-seven and one-half years. Commercial property is now depreciated over thirty-one years. What does this mean for the investor (like you or me, who might be considering buying a duplex as an investment?) It means less tax write-off each year (hence more taxes) and a need to re-think investment options.

Does it antiquate the Depreciation part of this program in its current version? Yes and no.

The program can still be used to calculate depreciation, but now requires more thought on the part of the user. Whereas before, such things as the proper time period for items to be depreciated were either automatically supplied or picked from a multiple-choice GEM window, now you have to figure out the time period from study of other sources and manually enter it into the equation.

Overall, I found ProA/D to be useful and user-friendly. It does need some fine-tuning to move from the "decent" category in which I would now place it and into the "very good" column.

First, the Depreciation part of the program is in need of update.

Secondly, for consumer-orientation, there needs to be more documentation or at least bibliographical data reference understanding Amortization and Depreciation.

Thirdly, the printout problem needs to be ironed out.

I found Customer Support for this product to be excellent. Like many software houses these days, Mountain Magic is a cottage industry, producing a quality product from the homestead. I would suggest calling for Customer Support in the evenings.

As to cost and availability, the program is presently available only direct from Mountain Magic, and the cost is a reasonable $29.95.

Mountain Magic Software, Route 1, Box 653, Boone, NC 28607; (704) 264-3021. ●

Aegis Animator ST

by John J. Anderson

Picture this: Two kites sit side by side on a lo-res screen. One red, one blue. They move independently as if caught by the wind. In an instant the one on the left begins to twirl head over heels, while the one on the right spins on its tail. Then they trade spins. They rotate, first together, then independently. The blue kite next smoothly slides right in front of the red kite, and as if in retaliation, the red kite wings swiftly around to the left to come in once again ahead of the blue kite. Even though they overlap each other now, each kite begins its own entirely independent antics, tossing, turning, spinning. As they continue their dance, we zoom in closer and closer, until we seem to actually "break through" the red kite, and it falls to the earth. Only the blue kite is left now, and it freezes solid alone in the center of the screen. From it, after a short pause, jump four new kites, exact clones of the original blue kite, but in yellow, green, orange, and purple. The kites assemble into a single, perfectly stacked multi-kite, executing complex spins and turns. Suddenly they all burst apart, spinning around the screen in unison, as we zoom closer and closer to them. They assemble into a chorus line, kicking out the points of their tails to the "beat" as they exit, screen right.

Yes, folks, this is for real, in real time, with real quality. Total time spent to create the animation described above: five minutes. Package: Aegis Animator ST. Verdict: wow. If graphics are at all a part of what matters to you in your exploration of the powers of the Atari ST, you ought to have a good look at Aegis Animator ST. For although a good imagination may be able to bring the description above to some sort of life, only a good processor can slap it on a screen with tangible speed, polish, and rock-solidity. And after all, that is what Atari graphics are for.

Aegis Animator ST is an extremely powerful animation tool. It can produce objects in 16 simultaneous colors from the full range of 512 available in ST lo-res. It can animate those objects by changing their shape, size, or color, or by dragging, rotating, or plotting a path for them on the screen. It allows you to create up to six separate "scripts," and cut or splice them together on a single storyboard. It allows you to import blocks and backgrounds from NEOchrome or similar paint packages. It provides a set of the most sophisticated

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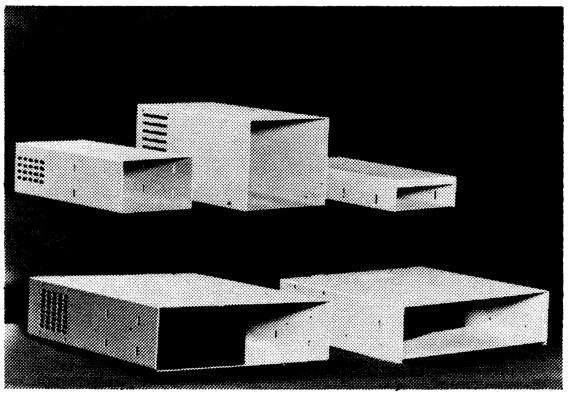

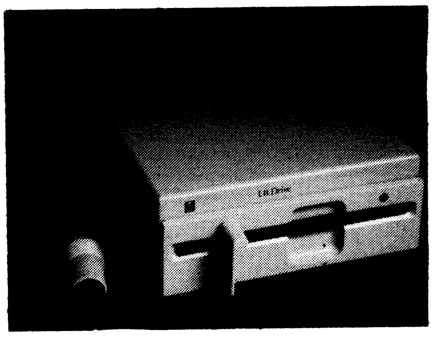

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Aegis Animator

continued from page 320

and powerful animation tools ever created for a microcomputer. And for all its capabilities, it is easy to use.

Animator ST is capable of producing three different styles of animation: color cycle, cel, and metamorphic (which also makes simple 3-D modeling possible). The metamorphic capability is what makes Animator ST so special. It uses the concept of "tweening" to control movement. This involves creating an image and then changing its position or shape on the screen in a segment of time. Each segment of time is designated as a tween. What is important is what the shape will look like at the beginning of a tween, and what you would like it to look like at the end of that tween. Software will create the intermediate steps, while you sit back and watch. The real power of Animator ST is its ability to handle the gradual (or not-so-gradual) change from one position to the next.

This concept differs from the traditional cell animation method, which is itself also possible using the package. To cel animate a bird flying, you would first draw a bird with wings spread, let's say, in the up position. In conventional film animation, the wings would be painted on one piece of clear celluloid (hence, "cel") that is laid over the bird's body, which is painted on another piece. For the next position, instead of redrawing the whole bird with a new wing position, you would use the same body from the first frame but with the wings repainted a little further down on a new piece of celluloid which is laid over the bird's body. This process is repeated until the wings are all the way in the down position. The same images can then be used in reverse, moving the wings back into an up position. At the same time you would want to move the bird (both pieces of celluloid) forward in relation to the background to give the effect of forward motion. When these images were played back in rapid succession the bird would seem to flap its wings and fly forward.

In the metamorphic mode of Aegis Animator ST, the bird could be made to fly by changing the shape of the wing, say from its up position to a position in the middle. This would occur in the first tween. Then, the wing's shape would be changed from its middle position to its down position in the next tween. At the same time, the bird could be pulled forward a little in each tween to create the illusion of forward motion. When the two tweens are replayed the wing will smoothly and automatically shift from its up position to its down position in one movement and the bird will move ahead.

Although you can import images from popular paint packages, you cannot use metamorphic shape-changing techniques on those images. The viable alternative would be to use Aegis Animator ST to create simple cel animation. You would load in paint images, for example, for the bird's body and all wing positions.

Another useful feature of Animator ST is color cycling—which causes the color of objects on the screen to change through a range of designated colors. Color cycling is very handy when you'd like to inject an imported background with a bit of motion. Using color cycling, you can make a static backdrop appear animated. For example, you can color cycle a picture of a waterfall to simulate falling water. This feature is matched by paint programs such as NEOchrome and Degas Elite.

But it is metamorphic animation that makes 3-D modeling possible. For example, let's say you wanted to simulate the rotation of a cube. To make a side of the cube appear as if it were coming around to the front, you would use the metamorphic tools to change the shape of that side, making it grow and change perspective. Simultaneously, you would make the side in front appear smaller and more distant in perspective to simulate its travel to the rear. Another method involves creating each side of a cube by specifying points that are on planes other than the screen plane, and then rotating the sides through the planes.

With all of these techniques combined, Aegis Animator ST becomes the most powerful animation tool yet released for the Atari ST computer.

When you boot up the animator program, a conventional Gem menu bar appears across the top of the screen. Its headers are Menu, Make, Move, Pick, Time, and Color. Under the Menu header, the selections include: Undo, which allows you to undo your previous action; Help Bar, which inserts a prompt line at the bottom of the screen to ease novice use; Fast Menu, which pops open an icon-based window allowing you to perform your most often-used tasks quickly and easily; Storage, which allows you to read and write animations, graphics blocks, backdrops, masks (monochrome backdrops), and strips to and from disk; Storyboard, which allows you to splice together varying sequences; Color, which enables various colors, palettes, and their associated effects; and Time, which allows you to tweak the speed of various tweens as well as entire sequences.

Under the Make header, you can create the shapes to be used in metamorphic animations. You can choose line, polygon, circle, star, or block, and use them to create nearly any

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HabaCom

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the really nice ones are the filters, and the selectable buffers.

The filters allow you to remove or replace characters in files you are capturing, viewing or printing. Say for example you want to view a file you got off a UNIX systems which defines an end-of-line with a line feed character. The ST expects a carriage-return, line-feed to terminate a line.

When you view or print this file under normal circumstances you would see only the first line of the file. Everything else would be off in never never land because the ST never got the carriage return code (control M) needed to bring the cursor back to the left margin. With the filters you can set HabaCom to replace the line feed with a carriage return line feed and so view or print the file normally.

These filters can also be used to strip some of the weird control characters that most word processors leave imbedded in files.

The selectable buffers let the user decide how much of and file they want held in memory before being flushed to disk. I like great big buffers so I don't have to listen to the drive every five seconds. But I have friends who are paranoid about losing data due to a power failure. And they want tiny little buffers so that stuff gets written to disk a.s.a.p. HabaCom lets the user choose 1K, 5K, 10K, 20K, or 30K buffers.

Another very strong point for this program is the documentation. HabaCom is a very easy program to get up and going and you can easily get minimal usage out of it without ever reading the manual. But many of the programs nicest features must be explained before they can be utilized.

The manual does an excellent job of this. It is clearly written, well laid out, and has an excellent index. I also like the fact that they included ASCII character and control character tables in the appendices. First time telecommunications users should also get good use out of the glossary of communications terms.

HabaCom was a nice surprise, a program that overcame my initial dislike by doing a whole bunch of things right. While the program is not perfect, most of the things I don't like about it are a matter of personal taste. The program has performed flawlessly on all the tests I ran on it. While it still wouldn't be my first choice for a telecom package I can easily see why it might be someone elses. And it wouldn't break my heart if this was the only one I had to use. ●

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Aegis Animator continued from page 321

shape imaginable. A Clone selection allows you to make multiples of existing shapes. Destroy allows you to remove shapes. Another pair of commands, Insert and Exchange, give you the ability to replace existing shapes or to add new facets to them.

The next header choice is Move. This group controls the different methods of moving an object about the screen. You can move objects sideways, in front of or behind other objects, rotate across the screen plane, rotate across a vertical axis, rotate across a horizontal axis, make bigger or smaller, move along a defined path, change color, choose whether a shape is filled or outlined, and make metamorphic changes (change the shape). Remember, the program itself will see to the smooth transitions between your tween start and end points.

To the right of Move is Pick. This menu choice controls what items or portions of items on the screen you wish to alter. The Pick menu determines specifically which items on the screen will be affected by another command. You can select all items, a number of them, one of them, a portion of one of them, or single points.

The next selection is Time. The choices under Time perform functions like moving to the next tween, replaying the animation created in the current tween or in all tweens, and playing the animation in a continuous loop. The last three items are preferences. The first, Ghost Mode, displays the entire animation in outline form only. This is useful for seeing objects which are currently behind other objects on the screen. The other choices, At End and At Start allow you to choose whether you view a tween as it exists at its beginning or as it is after it finishes.

The last choice on the menu bar is Color. It allows you to choose the colors you will be working in when you create the different objects on the screen.

So. Let's create a quick animation. First, create a shape: choose Polygon from the Make menu, in the color of your choice. Click the left mouse button to drop each angle on the screen, then the right mouse button when you are done. Now let's animate the shape. Choose Sideways from the Move menu, then drag the shape to a new position. We can review the tween we've just created by selecting Play Tween from the Time menu. To differentiate this action from the next, select Next Tween from the Time Menu. Next we'll make the shape spin, by selecting Y Rotate from the move menu. Set the cursor down where you wish the rotation axis to reside. Then move the shape through the rotation you desire. If you wish the shape to move on the screen as it spins, simply choose Sideways from the Move menu and select a new position for the shape before you click on Next Tween. The actions will now take place simultaneously. For a finale, choose next tween and rotate the object in the screen plane while making it recede to a small dot. Choose Big/Small from the Move menu, and make the change alongside the rotation command.

That's it! It has taken under a minute to create a sophisticated animation that would have required an hour or more of work using conventional animation techniques. And yet, Aegis Animator ST has the kind of depth that will keep graphics aficionados in thrall for quite some time.

Once you've broken into the mechanisms of Animator ST, you'll find that a bit of patience and attention to detail really pays off. Like any art form, animations created with this program will look better with the more time and effort you put into them. Backdrops, text scrolling on the screen and paint images that move about all need work done in a paint program like NEOchrome first.

Another example of necessary planning is an object suddenly appearing from behind another. Polygons exist on successive planes behind one another as they are made. So if you suddenly want your space creature to grow antennae smoothly, they need to have been made when the creature was originally created and kept as an inactive polygon behind the rest of the creature until needed. This needs a little forethought since going back later and inserting the antennae will always have them appearing on top of what is already there.

One way to get around some of these problems is with the Save and Storyboard features. You can create objects independent of the end animation and save them to disk as a polygon, cel, backdrop, or mask. Then go back and build the final animation piece by piece. When each element is needed in the animation, load it from the storage window.

The storyboard provides a similar capability without the flexibility of bringing in a single object at the right moment. Starting tweens can be perfected in one window and then the preliminary adjusting movements cut out as a tween and the final product moved into a new window ready to begin. Or, using the space creature antennae example, a copy of the current animation can be spliced into a clean window and the antennae added in that version of the script.

Planning is also useful in getting smoother animations. Speed is the main consideration in avoiding jerky movements. It takes Animator ST longer to draw a polygon than a mask or a cel and color changes take even less of the processing time. For these reasons you want to animate as much as possible with masks and cels, saving the metamorphic shapes for key roles and enhancements to the raster images. For example, a tree can be made by creating the trunk and some leaves in NEOchrome and the rest of the leaves or branches that need to move in Animator ST. The Animator ST leaves are drawn right on top of the raster image and even though just a few of the leaves move, it appears as if the whole tree is animated. Add to that a subtle color shifting of raster leaves and the effect is complete with only a few polygons needed.

Another way to get good control of the speed and smoothness of the animation is to use plenty of tweens. The speed is adjustable in each one so you have more control over individual movements.

Once an animation is complete or nearly complete you'll want to go back and watch the whole thing several times, looking for places in need of minor adjustments. You can make changes in an existing sequence, known as "upstream" editing. It is important, however, to consider an object's future when doing upstream editing, making sure to make the proper adjustments to compensate for any changes you have made. This is the only way to make sure that the transitions in your tweens will remain smooth.

There are some eccentricities and shortcomings with the package, but they are minor on the whole compared to the unbridled power of the software. The major problem with Animator ST is the implementation of its Gem interface, which can be, well, somewhat erratic at times. It is possible to pull down a menu, for example, highlight a selection, then click right through it, placing a dot on the screen "underneath" that menu, rather than choosing the highlighted selection. Mouse button clicks can seem "sticky," and it is sometimes difficult to get a click to register. When your mind is deep in the considerations of an animated sequence, these kinds of problems don't seem so trivial. For this reason it is in your best interests to learn the Fast Menu as fast as you possibly can. It is less bothersome to control, and really is faster to use. In my experience with the program, it was almost always possible to "undo" errors of the Gemish kind, though once I actually did lock up in the middle of animation. Needless to say, in rebooting I did lose the contents of the sequence in progress.

Animator ST also lacks the transition effects of a slide show program, and it is not possible to fade or dissolve between raster images. If it is a slide show program you seek, Aegis Animator is not the product you are looking for.

Then there is the fact that Degas images must be converted to NEO format in order to be accessed by Animator ST. This is not really a problem, as it can be surmounted, but it would really be nice if Degas files could be read directly into the program.

Another criticism of the package, though it may not be fully justified, is that the program is limited only to the lores mode of the ST. It is undeniable that many sophisticated effects are available in this mode, and its resolution is more than acceptable for most applications. On the other hand, if some subset of Animator ST were available for higher res modes, the utility of the program would be enhanced.

Despite these reservations, most serious of which is the occasional lack of cooperation from the user interface, Aegis Animator ST is one of the most impressive graphics packages available for the ST series. The package is unprotected, and lists for $79.95. A player program is included with the package, so animation programs can be easily distributed. Aegis Development invites owners of Animator ST to distribute the player freely with their own animations.

For information: Aegis Development, 2210 Wilshire Blvd., Suite 27, Santa Monica, CA 90403. (213) 392-9972. ●

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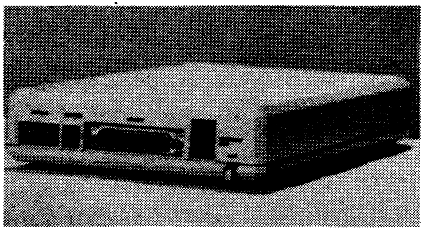

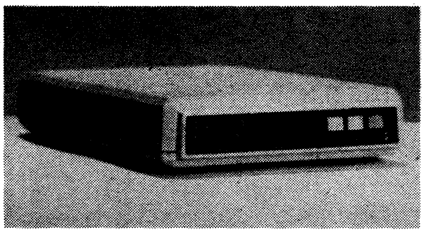

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HabaWriter, HabaSpell, and HabaMerge

Reviewed by Robert Westcott

HabaWriter, HabaSpell, and HabaMerge are a trio of word-processing tools for the Atari ST produced by Haba Systems in the U.K. and marketed in the U.S. by their U.S. branch in Silicon Valley.

HabaWriter, as its name implies, is a word-processing program, and was one of the first word-processing programs to come out for the Atari ST.

HabaSpell is a spelling checker that checks the spelling on completed documents (as opposed to real-time checking).

HabaMerge is a mail-merge utility, used for such things as making form letters look personal.

A common trait of all three, and one of my personal peeve areas, is that they are copy-protected. If you choose to buy one or all of these programs, make sure you own a good disk backup program (such as the latest release of Copy II ST), and make a working copy of the software. Programs that you use every day, and word processors certainly fit this genre, are going to be running someday when the power glitches, and when this happens, goodbye program (and productivity until you get a backup). To back up these programs, sector copy the disk, and then go back and bit copy track 79. Enough said.

HabaWriter, as stated earlier, was one of the first word processors to come out for the ST.

It features full GEM interface, multiple windows, search and replace capabilities, and block manipulation.

Most functions can be accessed either by the GEM interface or with Function Keys.

Set up initially for the Epson FX and compatible printers, the program can be reconfigured without a great deal of effort to work with other printers.

A point I really like about this program, is that for the most part, it follows the "what you see is what you get" convention. For the uninitiated, this means that what shows up on your screen is what shows up on the paper.

With HabaWriter, this convention is followed for Bold, Underline, Subscript, and Superscript (GEM and Function selectable). Glaringly missing from this list is italic, a type style any decent word processing program should have.

With HabaWriter version 1.1, you can get italic, but to do so means looking up the Hex printer code for your printer for italic, and sending that code to your printer. If you plan to write your whole document in italic, this may be a minor inconvenience, but it becomes a chore when you want to Italicize just a few words at a time, which is what most of us do.

Choosing Draft or Near-Letter-Quality printing is another option heavy users of word processing programs like to see readily available (either by GEM or Function Key). Again, HabaWriter requires us to look up and send a Hex code to our printer.

Setting up a document on HabaWriter is very similar to setting one up with any of the other ST word processors. Tabs tabulate, and word-warp moves words that would extend past the right margin to the next line.

There is no provision for text-justification, and for me at least, that omission is a serious flaw in the program. Text-justification makes a document look professional and is a significant reason to choose a computer/word-processor over a typewriter with selectable fonts.

Another provision left out is double-spacing. Yes, you can do it (double-spacing) manually, but why should you have to? Again, the reason you buy a computer and software is to save time and mental labor.

Getting down to the nuts and bolts of actually producing a document with HabaWriter, the typing of the document is very similar to typing a document with any of the other ST word processors of the "what you see is what you get" genre.

One nice feature of HabaWriter is that you can elect to see or hide the format symbols. Where this comes in especially handy is when using this program with HabaMerge.

A not-so-nice feature of the program is the fact that the "Delete" key on the Atari keyboard does not delete. I like the delete key, and it saves me a bunch of time, especially when I have to go back and capitalize something I forgot to put in Caps. Instead, with HabaWriter, you have to put the cursor on the next character and do a backspace.

Deleting a word or a block of text is easy with HabaWriter—just highlight the section by dragging the cursor over it, and then select "Clear" from the Edit menu.

A word of caution is due here for those used to using First Word or Word Writer ST—HabaWriter does not automatically make you a back-up of the old document sans your latest revisions! If you delete something important and your photographic memory is a bit underdeveloped like mine, it's gone!

Text manipulation (cut,

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Habadex PhoneBook

Reviewed by H. Clark Robbins

Habadex PhoneBook is a "personal information manager and phone dialer" from Haba Systems. It holds the same kind of information your Rolodex probably holds, except Haba Systems automates it for you. It is part of their Solutions line of programs for the Atari ST.

At just over 64K, the program loads quickly. I believe this is a small program because it is not overburdened with unneeded GEM features.

Habadex PhoneBook contains a number of graphics screens. The main screen, the PhoneBook screen, is made of graphics that are big, clear, and easy to use. No pull-down menus are used. The mouse control is very good and I found the selections to have appropriate, easy-to-remember names.

The PhoneBook uses a file selector to bring up data files. Since this program creates data files of type ".PHN," the selector screens for only .PHN file types. You should use caution to never open a second file while you have records in memory that have not been written to disk. If a new data file is brought in to memory, the existing data in memory is lost.

You can start adding records with the NEW RECORD display, selected from the main PhoneBook screen. The author has employed a vertical line cursor. Tab characters are used to move about the fields, or the arrow keys can be used. You can even point your mouse at the desired field and click. Carriage return is used to accept the entry into the database.

For each entry, the PhoneBook provides room for two phone numbers, (home phone and business phone). As you would expect, there is a place to enter first and last names. What you might not expect is that there is also room for the complete address, their company name and title, the category of their company (doctor, lawyer, indian chief), and an all-purpose comment field. There are even four "Note" fields in which you can put information that doesn't fit anywhere else. You can enter up to 300 records in each data file.

When you are satisfied with the record, you just issue a carriage return to cause the PhoneBook to accept the entry. This can be a problem for those of us who automatically go for the Return key after every field. With a little practice, you should be able to go for the Tab key just as automatically. Using the Tab key is a good feature because it is not necessary to move your hands from the keyboard when you are trying to concentrate.

Even though you have accepted the entry, it is only in memory. To write it to disk, the user must select the Save File option from the main PhoneBook display. This will overwrite the file on disk, so you should use caution: if you have trashed your data during this session, you should not save it over your good data.

The main display looks like a flip-up phone book. The name of the data file in use is displayed and there is an indication for how the data is sorted. When you arrange by a name, the file is obviously arranged alphabetically. Along the side of this flip-up phone book are the "Tabs." I think the choice of the term "Tabs" for these is ambiguous since they have nothing to do with the Tab character. The term is defined the first time it is used, and at the time it seems rational. But after plodding through data entry, you may not remember that the index is also called "Tab."

The manual instructs you to select Tab A from the phone book's index to access the File List. The File List allows you to view your records. The File List shows ten sorted entries at a time. There is no explanation of why Tab A provides all the entries in the sample data file. I assumed A stood for All, but alas, selecting A just means that the File List will begin at A and display all the entries it has room for.

By default, the File List displays the first and last names and home and business phone numbers of the ten entries. The File List display is big and easy to read.

By clicking on an entry in the File List, you can "zoom in" on an entry and review all the fields associated with it. In the Zoom mode, you can modify the contents of the entry, or delete it altogether. Note that if you accidentally scramble an entry, you are not forced to save the entry. Then you can either return to the File List or zoom in on an adjacent entry (either forward or backward).

As stated previously, the File List defaults to displaying first and last names with home and

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HabaWriter

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paste, format, etc.) is handled in HabaWriter in essentially the same way as other word processors. These aspects of the program seem to work well.

Pagination likewise is straightforward, with the usual conventions of hard and soft page breaks. Soft page breaks can be hardened or hard page breaks made from scratch with a "Control-L" executed when the cursor is in the proper position.

Saving documents is also straightforward, and HabaWriter allows the saving of documents with control characters or in straight ASCII.

There is no compatibility between HabaWriter and other word processing files, and no provision made for converting, for instance, First Word files to HabaWriter files. I tried a Word Writer ST "Doc" file in HabaWriter, and got a lot of garbage on the screen and on the printout.

HabaWriter is compatible with HabaMerge, exclusively so, and herein lies its greatest utility, at least in this writer's opinion.

Used together, HabaWriter and HabaMerge allow you to write form letters and personalize them.

The way you do this is you write the letter with HabaWriter much the same way you would write a normal letter, but instead of typing in the name and other personal information you type in field numbers in brackets (example: "1}), where the personal information parts would go.

Next you type up on HabaWriter a list document. The list document is simply a series of one-line data entries, each ended with a carriage return, with hard page breaks separating each record.

In plain English, say you want to invite a number of friends over for a get-together. You want each to bring some of the food needed so the party won't bankrupt you. You also don't want to get writer's cramp typing two dozen invite letters.

First, you type one invite letter, using HabaWriter, but instead of putting in a name after the "Dear," you put in "1}. When the "Please bring" sentence comes, instead of ketchup or whatever, you put in a "2}.

Next you do the list. Each record in the list consists of two lines. The first line is a first name (followed by a carriage return. The second line is simply what you want them to bring, followed by a carriage return. Finally, you separate this record from other records with a hard page break. Save the list and you're ready to merge the letter with the individualized insertions.

Put the letter and the list (I label mine "LIST.DOC" for lack of creativity) on the same disk as HabaMerge (I like Randisks) and run the program. The program is straightforward, GEM based, and an average orangutang could run it. I monkeyed around with it and had it running in short order.

HabaSpell is Haba's entry into the spelling checker sweepstakes. It boasts a 17,000 word dictionary, with the ability to add more words.

HabaSpell is not a real-time-spell-checker, which means you have to finish the document or part thereof and then check the spelling.

Quite frankly, I prefer a real-time checker, and use one to write my reviews. Real-time spell-checkers do the work as you type, and if your brain and fingers operate at different baud rates, as mine often does, this is definitely the way to go.

Real-time aside, the other features writers look for in spell-checkers are large dictionaries and a good algorithm for choosing options.

The reason for large dictionaries is that small ones don't have room for such words as algorithm, which I misspelled as I was writing this article (and Thunder alerted me

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HabaWriter
continued from page 326

to, and corrected). It should be noted in all fairness that "algorithm" was in the HabaSpell dictionary, but as will be explained later, many even more common words and word forms were not.

With respect to the size of the included main dictionary, HabaSpell suffers in comparison to other spell-checkers, and worse, does not include many reasonably-common words.

In checking just a few of the early paragraphs of this article with HabaSpell, I found the dictionary did not include such common words as "trio," "marketed," "trait," and "peeve." The Kingston Trio would be quite peeved if they knew Haba marketed a product with such traits.

To give you an idea of the size differences of spell-checker dictionaries, I found that HabaSpell had a 17,000 word dictionary, compared to 50,000 for Thunder, and 85,000 for the spell-checker dictionary included with Word Writer ST.

The reason for a good algorithm is because the simplest algorithm, giving the words in proximity in the dictionary in alphabetical order, does not necessarily get us to the right spelling quickly. You may well make a common mistake, but common mistakes aren't necessarily close alphabetical mistakes. To write a good algorithm, you must understand typing and the American educational system.

The writers of HabaSpell, quite frankly, took the easy way out to reference to an algorithm—that of straight alphabetical proximity. In contrast, Thunder has a different algorithm, and seems with its list of possibles first shown on the screen, to include the word I am trying to spell.

Choosing a software product is a matter of features, price, and preferences, the latter being used more as a tie-breaker than anything else.

HabaWriter, HabaSpell, and HabaMerge all face competition in the marketplace.

Price-wise, they are all about average for their genre of software.

A word to the wise—when you do decide on a particular piece of software, shop around for price—it varies greatly from outlet to outlet. I found HabaWriter on sale at various discount software distributors from a low of $37.99 to a high of $54.95. Read the ads in *Computer Shopper*—the time spent can save you money!

Considering that price is not a significant choice factor to reference these products, we then must turn to features, and here's where I must in fairness to you, the reader, tell it like it is.

First, consider the inconvenience of copy-protection. I, for one will continually wage war against this unnecessary evil. Copy protection only hurts the legitimate user—pirates are not stopped by it in the least. It hinders use of RAMdisks and hard disks without true benefit to anybody, except maybe the producers of copier programs that allow the "protected" programs to be copied.

With respect to HabaWriter in particular, it simply does not stack up to the competition reference features. Both First Word, Version 1.06, and especially Word Writer ST leave it in the dust with features and ease of use. Neither is copy-protected, and both feature superior features and documentation, and provide tutorials, which HabaWriter does not.

HabaSpell simply does not stack up to either Thunder, or the spell-checker that comes as part of the package with Word Writer ST. Both of the others have much larger dictionaries, and boast the option of real-time checking. Thunder adds such bells and whistles as FOG and Flesch indices, and a word counter.

I did not have the opportunity to compare HabaMerge with similar programs. It is a good program, reasonably priced (I found it for $23.97), whose chief fault is that you need HabaWriter to use it.

All three of these programs work and have utility and potential. They badly need revision to catch up with the competition.

When you make your choices in these software categories, tell them you read about it in *Computer Shopper!*

●

Habadex PhoneBook
continued from page 326

work phone numbers. You can sort by any field, even the miscellaneous "note" fields. When you select the "Arrange" option from the PhoneBook main display, you are offered the option of "Arrange By" with the names of all the fields displayed. You may select one of the fields by which all entries will be sorted. Likewise, you can select a field which will also be displayed.

As you have guessed, Habadex PhoneBook will dial the phone if you have a Hayes-compatible Smartmodem. This section of the manual is somewhat unclear, but perhaps only because I am not familiar with the term "OCC Codes." This term is not discussed in the manual and I have not seen it in terminal programs' documents. I gather that this is the access codes used to access a long distance phone service which is NOT your "Dial 1" carrier.

Let's assume you save your long distance number with the "1" as the first digit. It appears that some of the access codes will require you to strip the "1", others want the "1" to remain. Habadex PhoneBook offers you the choice to accommodate either set up. And, of course, they offer you the choice of dialing either the number as it is saved in the entry or dialing the number with access codes attached.

You can have your modem pulse dial or tone dial your numbers. Repeating my experience with really cheap telephones, my modem misdialed a phone number with Habadex PhoneBook when in Pulse mode. I do not know if the problem was with the software, the modem, or the ever-reliable phone company. When tone dialing, Habadex PhoneBook is fast and reliable.

If you make a mistake and forget to power on your modem or plug it in, no problem. If the PhoneBook receives no response from your modem, you are told this and the soft-

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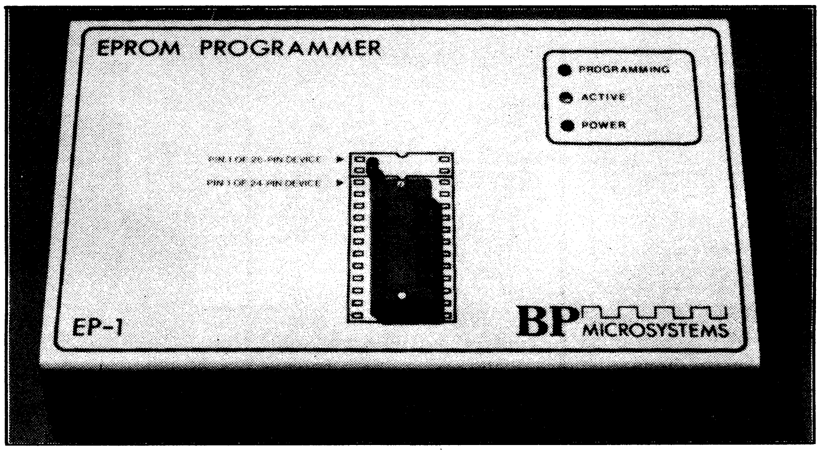

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- 27128
- 27256
- 27C256
- 2816A
- 2817A
- 2864
- 5133
- 5213
- 52B13
- 52B33
- 5516A
- 55B33
- 5517A

SGS
- M2716
- M2764

SMOS
- SPM27C64
- SPM27128
- SPM27C256
- SPM2864

TI
- SMJ2516
- TMS2516
- SMJ2532
- TMS2532
- TMS25L32
- TMS2732A
- TMS27P32A
- SMJ2564
- TMS2564
- TMS2764
- TMS27C64
- TMS27P64
- TMS27128
- TMS27C128
- TMS27C256

Toshiba
- TMM2732
- TMM2764
- TMM27128
- TC57256
- TMM27256

Xicor
- X2804A
- X2816A
- X2816H
- X2864A
- X2864B
- X2864H
- X28C64

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measuring something as thin as a sheet of paper with a ruler.

Being an extremely bright individual (you must be extremely bright, you're reading this column!) you think that you will count out a hundred pages and measure the height of the stack. By dividing that be one hundred, you can figure out how thick each sheet of paper is.

The problem with this approach is that your stack is almost certain to fall between two marks on the ruler, meaning you have to guess at the actual height. The correct way to handle a problem where there is some question of the accuracy of a measurement is to invoke the all-powerful tool of statistics.

Statistics tell us that we can obtain a better value if we take many measurements and then average them together.

Knowing this, you decide to measure the height of a stack of 100 sheets of paper many times. You run into a problem when you realize that no matter how many times you measure the height of the stack, you always come up with the same "guess" for the height. (You were oh so very careful the time you made the first measurement.)

A sudden insight comes to your rescue, you will measure the height of a stack of 100 sheets, 200 sheets, 300 sheets and so on until you have many measurements to use in figuring the thickness of a sheet of paper.

Completely unknown to you, the sneaky manufacturer has packaged several partial lots together in your box of paper. Some of the first sheets are a little thin, and some of the sheets towards the end tend to stick together so your 100 sheets don't always contain 100 sheets, and 100 sheets are not always the same thickness.

What has happened is something called the "real world." Unlike in all your college textbooks, there are all sorts of things conspiring to keep your measurements in error. There is actual variation in the item you are measuring (the thickness of a sheet of paper) and there is error in your measurement (a ruler is only so accurate, you have to guess the correct height when it falls between two marks) and there may be additional error introduced that you are unaware of (some of your 100 sheets contain more than 100 sheets.)

You gather your data in hand, and with the aid of some handy graph paper you plot your data points and get ready to draw a straight line through the data points. Guess what? There is no way for a straight line to pass through all your points. For any line, some points will be above the line, some will be below the line.

You now have to draw the "best " line that fits your data. Such a line will be above certain points, and below others, but above which ones and below which ones, and how much above or below.

What you need to do is to fit a curve to a set of data so as to minimize the "error" of the curve. (For the readers that have not had calculus, a straight line really is a curve in the mathematical sense, even though it doesn't "bend.")

And here is where we come to the first problem, we don't know what the actual value is, so the classical definition of error ((measured - actual)/actual) cannot be used. In this case, we are really discussing the difference between the curve we are fitting and the data we are fitting it to, so our error has to do with the distance between the actual set of points and the curve we draw through them.

Knowing that we want to minimize the error for the complete set of data, we have to first define the "error" and then find some way to minimize it.

There are several ways to define the error in this case. We can say we want to find a curve such that the largest distance between the curve and any data point is the smallest value possible. (The curve passes very close to all data points.) This is known as the minimax approach. The problem with this approach is that there is no easy way to minimize the error.

Another way to define the error is to sum up all the individual errors (distancce between the curve and the actual data point) and minimize the sum. The problem with this approach is that we don't care if the error is in a positive or negative sense, we only care about the actual distance, so we really want the absolute value of the difference.

There are a lot of different ways to define error, and to minimize it, but a long time ago we found a way that seems to work quite well, and is simple to implement. That way is known as the Least Squares approach. In the least squares technique, the error is defined as the sum of the differences between the curve and the data squared.

(If yc is the y value from the curve and ym is the measured or given y value, then the error for a given point is (ym - yc) * (ym - yc) and the error for the curve is the sum of the errors for each point). This offers the advantage that all deviations whether above or below are a positive quantity and it deals with the complete curve, not just a point or two. It is also easy to come up with a way to minimize the error.

(On a more complete view, if the mean of the data has a linear distribution the least squares approach is an "unbiased estimate." Math freaks are referred to *Introduction to Probability Theory and Statistical Inference, Third Edition* by H.J. Larson.)

If you think back to your calculus days, you will remember that to find the minimum of a function you take the derivative and set it equal 0 and solve for x. Simple enough!

At this point, my hands are tied as I cannot produce passable mathematical notation on my current printer, so the more math inclined please bear with me.

In the case of the paper thickness, we want an equation that looks like yc = Ax + B such that the summation of (ym - yc) * (ym - yc) for all data points is a minimum. (Any straight line can be written as y = Ax + B.)

This means that we select A and B to minimize our error. The error is an equation in A and B so we take partial with respect to A and B and set them equal to zero. Doing this produces a pair of equations, which if solved give us A and B.

We already have a program to solve linear systems, so all we have to do is produce the equations for the partials of A and B, (if your calculus is weak, or if you never had it, hang in there, I'll show you how to do all this without calculus) and run them through our linear systems program.

Up to this point I have been talking about an equation of degree 1 (a straight line) but it is also possible to fit curves of any degree. Quadratic and cubic curves are sometimes required to fit a data set.

You can always fit a higher order curve to a set of data, so it is up to you to "guess" what the relationship is and try and fit the proper curve. If you try for too high an order curve, the curve will have hills and valleys that are not really present in the relationship.

In any case, regardless of the degree of the curve being fitted, we will be trying to come up with a polynomial in x that "fits" the data well, and then by taking the partial of the error terms, we get a set of equations to solve to find the required coefficients.

All of this may sound confusing to you if your calculus is weak, but what we have is a very simple pattern that you can extend to whatever degree you need. I will present programs for first, second and third order curves. (First order Least Squares curve fitting is often called linear regression by business majors, who often use the technique without understanding what is really happening.)

Let's start off with a simple first order curve (straight line) fitting program. What we want to be able to do is find an equation that looks like A0 + A1x = yc, that fits our data well. This means that the summation of the error (remember the error is (ym - yc) ∧ 2) is a minimum.

At this point, we are dealing with two equations, the first order polynomial we are trying to fit to the data (A0 + A1x = yc, where A0 and A1 are unknown constants) and the error which is the summation of all of the (ym - yc) ∧ 2 terms, (ym is the measured yvalue and yc is the value we calculate based on our polynomial.)

In order to find the best A0 and A1, we have to take the partial derivatives of our error term and set the partial equal to 0. This gives us a third set of equations, known as the normal equations. At that point all

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Habadex PhoneBook

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ware recovers gracefully. Some programs leave you hanging ad infinitum, forcing you to reboot. This could be catastrophic if you were testing new entries before installing them in your PhoneBook by saving the file.

Habadex PhoneBook does not support a "hang up" command. But then, I am not sure you will ever need one.

If you are unimpressed with Habadex PhoneBook from what I have said so far, you are not alone. Although the PhoneBook is very well implemented and generally very well documented, you may ask if this is really necessary. Although people who make a lot of business calls may find it useful, most of us just use the phone dialer from our terminal package if we really need an automatic dialer. But the best features of the PhoneBook are the "minor" features.

I think you will be as impressed as I was with the remaining features of PhoneBook. It can print labels for you. That doesn't sound like a difficult job until you see the way that Habadex PhoneBook can manipulate the fourteen fields. If you like, you can concatenate first and last name fields, with a space in between. You can also add the person's job title to create a label that might say "Joe Morgan, Vice President" on the first line.

When you have selected the fields you wish to see displayed on your labels, you can begin printing labels. In a similar fashion, you can print listings of your PhoneBook entries.

If you have uncabled or otherwise disabled your printer, no problem. If there is no response from the printer within five seconds, PhoneBook tells you. Nothing could be simpler.

The document includes a discussion of the fields' length so you can change the fields around to hold whatever data you need. Each field can hold either numeric or text data. There is a complete procedure for changing field titles of the database. The amended field names become part of your data file when you save it to disk. In this way, you could set up several different scenarios for different applications.

With these sorting, printing, and phone dialing features, it occurs to me that this is the perfect database for small clubs and businesses. I'll grant you that it will not hold the Library of Congress, but often big, complex database programs are too much trouble to learn for small applications. If you do not need a lot of room (remember: 300 entries maximum) I think Habadex PhoneBook may be a simple, clean, cheap way to get your club rosters into order.

Habadex PhoneBook's manual is short and easy to read. It takes you through the program, from soup to nuts, and even has a discussion of how to operate the file selector. Key words in the manual are in bold print to make reading and finding things easier.

My big complaint with Habadex PhoneBook is that it is copy protected, so you have to load the program with your original disk. Haba promises you that you will be able to purchase a replacement if your original diskette becomes damaged. However the phone number in the manual is no longer valid. (I believe Haba Systems, Inc., must have moved since none of their old phone numbers still work).

Haba Systems should do as they say and not as they do. In the introduction they offer this Haba Hint: "You should have a back-up of any disk you can't do without. Be sure to make a copy of your data disks." It is as though, through copy protection, they are asking us not to become too dependent on PhoneBook.

Apart from the copy-protection, I think Habadex PhoneBook is a good buy at $57.95. It is available from: Haba Systems, Inc., 6711 Valjean Avenue, Van Nuys, CA 91406. ●

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we have to do is run the normal equations through our linear systems program and we have our answer.

In order to see how to get the normal equations, you have to replace yc with the calculation of yc. We can rewrite the error term as (ym - (A0 + A1x))^2, (remember yc = A0 + A1x). We then take the partial of the sum of the error terms.

At this point, I must resort to some mathematical notation, so have a gander at Figure 1. The funny symbol means summation (add all of these things together). To see the pattern that keeps you from having to know calculus, you must remember that any number raised to the zeroth power is 1, any number raised to the first power is itself. (I take it you know what the rest of the powers mean.)

For Figure 1a, the first order curve, you will note that in the first row the highest term is in x raised to the first power. The second row starts with x raised to the first power, which is one more than the starting term in the first row. The terms on the far side of the equals sign are also increasing by one power of x for each row.

Figures 1b and 1c show second and third order normal equations. The whole trick here is to figure out what the first row should look like, and all the rows needed below the first row can be had by simply multiplying the row above by x.

The rule of thumb: The first term is A0 times x raised to the zeroth power. The second term is A1 times x raised to the first power, the third term is A2 times x raised to the second power, and so on as far as needed to reach the equals sign. How far do you go? If you are fitting a second order curve, the last term on the left of the equals sign in the first row is the term containing x raised to the second power.

So the simple pattern for forming the first row is to start with A0 and x raised to the zeroth power, and keep going up until you get to x raised to the 0 power where 0 is the order of the curve you are fitting. After that you have an equals sign and then y times x raised to the zeroth power.

As I said before, once you have the first row, the row below is generated by multiplying each term by x. The first term in the second row is A0 times x raised to the first power. We now have a simple pattern to follow to generate as many rows as we need. But, how many rows do we need? You know you have enough rows when the first term of the row is x raised to the 0 power, where 0 is once again the order of the curve being found.

That is the pattern of the normal equations needed, a very simple pattern allows you to be able to write the normal equations for any order of curve you may feel like trying to fit.

OK, so now you have the normal equations, what do you do with them? Remember that I said the funny symbol means add all these things up? When you read in a data point (an x and y value) you just compute each term, and add it to a running tally.

In the procedures dosums, you can see the calculations of x, x squared, x^3 and so on, and see how we just add it to the running subtotal. We also do the same thing for the terms on the right side of the equals sign, y, y times x^1, y times x^2 and so on.

The calculation is complete when we have read in all of the data points. At that point all we have to do is save all the computed sums in a file so we can run it through our linear systems program.

I use an array for most of the summations because I am comfortable with it, but you may wish to use another method to hold your running totals. The important thing is to make sure the data gets saved to disk in the proper order, that is in the same order as the normal equations.

After the data has been saved, and run through the linear systems program, the solution left on disk is the coefficients of the polynomial, A0, A1, A2 etc. A0 is the coefficient for x raised to the zeroth power, A1 is for x raised to the first power and so on.

Well, as usual I've run well over the 1500 word mark so I'll wrap this up quickly. I have been surprised by the interest shown in this column especially from the IBM folks (I didn't think you would read the column since it's back here in the Atari ST section) and I have received several letters from readers with specific wishes. You may not get what you want, but it never hurts to ask.

One thing I do need to know is whether the C code can be figured out by the readers that don't consider C their native language. I know FORTRAN is usable for this stuff (although there are books full of these programs in FORTRAN) and I think there is a Modula-2 for the PC that can be used for numerical analysis.

Go ahead and let me know if you have problems with the C listings. The curve fitting programs are on the same disk as the linear systems program, shopper math pack disk 1. It is $5 for the source and executable, and be sure to specify the IBM 360K or Atari ST version.

Math Pack Disk 1, 3456 Willis Drive, Titusville, FL 32796; Attn: Wynn Rostek. ●

Hacking The ST

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format. FF7 indicates the 360 cluster format (single-sided). The second FAT entry is the terminating value FFF. The first FAT that can be used by the system is FAT 2, (FAT entry numbering starts with 0).

Because 3 bytes make up 2 FAT entries, to actually find out what is in a FAT entry you have to go through a complicated little algorithm. Given the FAT number you want to check, you have to decide which pair of FAT entries it is in, and whether it is the first or second FAT entry within the pair. To find the pair it is in, simply divide the FAT entry number by 2, (you need to discard any remainder, this is integer division). To find out whether it is the first or second entry of the pair simply look at the FAT number. The first FAT entry of the pair is always even. If the FAT number is odd, it is the second entry of the pair.

Now you are ready to actually get the 2 bytes (really the three nybbles) that make up the FAT entry. The starting byte is found by multiplying the FAT pair number by 3, (remember, it takes 3 bytes to make a pair of FAT entries). As an example, if you were trying to decode FAT 5, you would divide 5 by 2 to get 2 (discard the remainder). FAT 5 is in FAT pair 2. You then multiply the FAT pair number (2) by three to get the starting byte number, which is in this case 6.

You then get bytes 6, 7 and 8, these bytes make up FAT pair 2 which contains FAT 4 and FAT 5. The three bytes are split into 2 FAT entries by splitting the middle byte. At this point it helps to think of the three bytes as being made up of 6 nybbles, (a nybble is 4 bits, so with 2 nybbles in a byte, our three bytes become 6 nybbles). Since a hex digit is made up of 4 bits, it is easy to picture the following operations if the numbers are written in hex.

The first nybble of the even FAT entry (4 in our example) is made up of nybble 3, 0, and 1. The second FAT entry (5 in our example) is made up of nybble 4, 5, and 2.

The number you end up with is the contents of that FAT entry. While this routine sounds rather complicated, it can be implemented in machine language in just a few statements. Figure 1 (page 315) shows a sample FAT table, and how it is decoded. A quick look at it should help tie all the discussion of FAT entries together.

At this point, a run down of the attribute bits seems in order. Only the lowest 6 bits are used, and only the lowest 5 bits are used for floppy disk drive files. Bit 0 (the lease significant bit) is set if the file is a read only file. When this bit is set, the system is inhibited from writing to the file. Bit 1 is set if the file is hidden. A hidden file does not show up when you list the directory. Bit 2 is set if the file is a system file. System files are part of the operating system, (this is a hold over from earlier years and another machine).

Bit 3 set indicates that the file is actually the volume label, (the volume label allows you to assign a name to the disk). Bit 4 being set indicates that the file is actually a subdirectory. Sub-directories are discussed in greater detail a little later. Bit 5 is the archive bit. When this bit is set it indicates that the file has been modified since the last backup operation, (people don't backup floppy disks, they make additional copies of them). This helps reduce the amount of time a backup takes because you can easily backup only the files that have changed.

The last item to discuss to wrap up the SF354 drive is the form of the nested directory structure. As mentioned earlier, if bit 4 of the attribute byte is set, then the first 11 bytes of the directory entry are not a file name, they are a folder (or sub-directory) name. Space is allocated for a subdirectory just as it is for a normal file.

If you look at the contents of a sub-directory, you will find that it contains 32 byte directory entries just as in the root directory. There is a difference between the root directory and any sub-directory, and it has to do with the entries that appear in the directory.

Everytime a sub-directory is created, it has two special entries that are created at the same time. The two entries are "." and "..". These two files serve as pointers that allow the nested directory structure to be more easily traversed.

The ".." entry is a back pointer to the parent of the directory. This pointer allows you to move up one level in the nested directory. If the ".." link is 0, that indicates the parent of the directory is the root directory.

The "." pointer is a pointer to the FAT entry for that directory. Because a sub-directory may require more than cluster to hold all the file entries, the additional space is allocated just as it would be for a normal file, the FAT entries form a linked list of cluster allocations.

The root directory is fixed in size, it cannot expand if needed. If you try to exceed the alloted number of directory entries for the root directory, you will be told that the directory is full. Since the root directory is made up of 7 sectors, you have room for 112 entries in the root directory (7 sectors * 512 bytes per sector = 3584 bytes, 3584 bytes / 32 bytes per entry = 112 entries).

To help find your way around on an SF354 disk, a disk map is presented in Figure 2 (page 315). This map identifies where the boot sector, both FATs, the root directory and data areas are found.

Since I seem to have run away over my alloted space once again, I'll present the format of the SF314 drive the next column, along with a run down on the magic boot sector. I'll also present some programs you can use to analyze the data on a disk. ●

bit number	bit function
15	4 minutes
14	2 minutes
13	1 minute
12	32 seconds
11	16 seconds
10	8 seconds
9	4 seconds
8	2 seconds
7	16 hours
6	8 hours
5	4 hours
4	2 hours
3	1 hour
2	32 minutes
1	16 minutes
0	8 minutes

Table 1.
File time bit weighting.

bit number	bit function
15	4 months
14	2 months
13	1 month
12	16 days
11	8 days
10	4 days
9	2 days
8	1 day
7	64 years
6	32 years
5	16 years
4	8 years
3	4 years
2	2 years
1	1 year
0	8 months

Table 2.
File date bit weighting.

starting byte	length (bytes)	function
0	8	File name
8	3	File extent
11	1	File attributes
12	10	Reserved
22	2	File time
24	2	File date
26	4	File size

Table 3.
Directory entry fields.

Review of Regent Word & Regent Spell

by David McLean

Regent Word 1 is touted by Regent Software to be a full function word processor for the Atari ST. I found it straight forward and simple to use, but with enough features to satisfy the more experienced user. Regent Word 1 is not GEM based: there are no drop down menus or other GEM features. The program is entirely keyboard driven.

Regent Word is supplied on a single sided disk and is copy protected, so drive A must contain the original disk if running from a hard drive. On bootup you are prompted to enter the correct date and time. After pressing Return you're ready to get started. The first Help menu is displayed on the screen with a short description for each command. To start your first file you just press the Undo key to exit the Help menu and begin typing.

Loading a file is simple, just depress the F1 key and select the letter that preceded the file you wish to load. The default drive is changed by depressing the Tab key. This changes the default drive from A to B. While working on a file the tcp line of the screen displays the amount of free memory available, the current time, and whether the keyboard is in Caps lock.

One thing I look for in a program is the amount of on-line Help functions or menus. As the price of memory and disk space comes down, programmers have more flexibility to provide these features. Regent Word does just that. Regent Word has five built in Help menus for quick reference. At any time you can cycle through the Help menus by just pressing the Help key and using the space bar to cycle through them one at a time. You can exit it at any point by just pressing the Undo key, taking you back to the text screen.

Since Regent Word isn't GEM based, the cursor movement is entirely keyboard driven. The Cursor Arrow Keys move the cursor one position up, down, right, and left. By holding down the Control key while pressing one of the cursor arrow keys the cursor will move either up one page, down a page, right to the end of the line, or left to the beginning of the line. The cursor can also be moved to the top or the bottom of the file by using the Alternate T (ALT T) for moving to the top or ALT B to move to the bottom of the file.

Regent Word is not a "what you see is what you get" type of word processor. That is, special control characters must be imbedded in the text to tell the program when to perform certain functions when the file is to be printed.

Most of the more common options are supported such as search & replace, text centering, bold and underline text, move or delete block functions, page numbering, header and footers, and word count. Using imbedded format commands in a document takes a little getting use to, but doesn't seem to impact the final result.

The format commands that Regent Word use are easy to remember and tend to associate themselves with what they're trying to do.

CONTROL A...sets the amount of space between lines
CONTROL B...bold print
CONTROL C...centering text
CONTROL U...underline text
CONTROL E...elongated text
CONTROL F...one line footer
CONTROL H...one line header
CONTROL I...allows the top margin to be set
CONTROL L...allows the left margin to be set
CONTROL N...toggles the right margin on and off
CONTROL P...page break
CONTROL Q...set page number
CONTROL R...allows the right margin to be set
CONTROL S...pitch control for the JUNKI 6100 printer
CONTROL T...to change the printer's internal character font

The format commands embedded in your text file control what the final document will look like. You generally start with the format command, insert text to be affected by the command, then terminate the command by issuing it again. An example of such is if I wanted to underline a word, I'll type CONTROL U XXXXX CONTROL U. This would underline the word or phrase between the two CONTROL Us. The other format commands work in a similar manor.

Regent Word also has advanced editing features, making full use of the Atari keyboard. Most commands are easily executed by single keystroke commands. The Search and Replace functions are controlled by the function keys. F3 defines the phrase to be searched for, while F5 defines the replace phrase. After defining what to search for just press F4 to begin the search and if you want it to be a global replace (replace all occurrences) simply give it an ALT G.

Deleting, replacing, moving, or duplicating text or blocks of text are also made easy using single keystroke commands. When Regent Word commands are used to delete text or blocks of text, the text is stored in a buffer until the next text is deleted. To delete a line of text from the cursor position just hold down the Shift key and press the Delete key., the text is removed from the screen and stored in this temporary buffer. Once the text is deleted you can move the cursor to a new position and restore the deleted line by holding down the Shift key and pressing the Insert key.

To define the beginning of a block move the cursor to the first character of the block and press the F6 key. After moving the cursor to the end of the block, Regent Word gives you a couple of choices. To just mark the end of the block, for duplicating the block use the F7 key, this leaves the original block intact, but stores the block in a temporary buffer. If you wanted to delete or move the block, F8 would have been used. F8 deletes the marked block and stores it in the temporary buffer also. Now using the F9 key you can move or duplicate the block as often as you like. By putting the deleted text in this temporary buffer Regent Word gives you a second chance. Some word processors that I've come across don't give you this: once you've deleted the text it's gone forever.

Regent Word provides a print preview option to preview what the printed page will look like before printing. This feature came in very handy since I prefer the "what you see is what you get" type of word processor. By pressing ALT P the print routine is initiated. It prompts you to Press P, For Printer or Press S For Screen. To just preview the file press S for screen. The file will be displayed one page at a time. Since the page of course has more lines then the screen shows, you use the arrow keys to scroll up and down on the page. By pressing the Spacebar the next page will be displayed.

It's really nice when looking for the special format commands that were embedded in the file and the way that they affected the file. Its easy to leave one of the embedded commands out and not notice it until you are 10 pages into your file's printout.

All in all Regent Word is what they say it is. It's not a $10,000 Tech Publishing package, but it performs well with no noticeable bugs. If you're in the market for a word processor with the features that this one has then I'm sure Regent Word would be a good choice.

Regent Word is a product of Regent Software and can be purchased for $49.95.

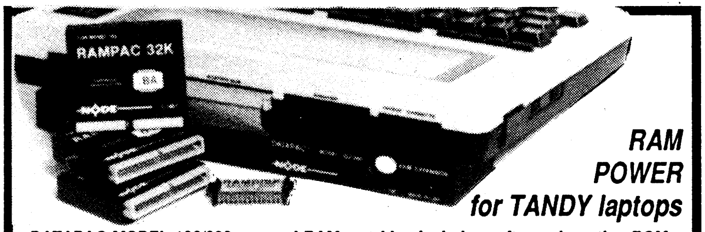
Regent Spell is a GEM based spelling checker for the Atari ST computer. It can be paired with Regent Word 1 word processor or used as a stand-alone program. It comes on a single sided disk and is copy protected. Since the program is GEM based the mouse is used to drive the program through it's various checks. After loading the program the title page is displayed and asks you to insert the file disk. Now a simple click on OK starts the program.

The standard GEM file selector box appears showing the files available on the disk. Just click on the file displayed or type in the correct name in the edit block. One click on the OK and you're off. If a spelling error is detected or a word that is not found in Regent Spell's 30,000 word dictionary the program will pause, highlighting the possible spelling error in a green field. Also, up to ten possible choices are displayed for the correct spelling. You can select the correct word using the mouse or edit the word in question using the keyboard. Pressing Return or clicking in the Return box corrects the error and continues on to the next possible error.

If the word the spelling checker caught was correct, but not in the Regent Spell dictionary it is easily added by clicking on the Insert box. This adds the word to the dictionary list and allows the program to continue checking the document. If there is a word in the dictionary that for some reason you might want to remove it's equally easy to delete it from the dictionary. Just click on the delete box when the word appears and it's gone forever. The Regent Spell dictionary disk has enough space to add about 33,000 more words to the 30,000 words it already contains making it a very versatile spelling checker. The program's dictionary is only limited by disk space and usable memory in the Atari ST. The Regent Spell manual claims that with a one meg machine and a hard-drive it can hold about 250,000 words.

Regent Spell is a very quick and easy to use program, but I would have liked to have seen a larger dictionary. The dictionary seems not to include suffixes and plurals of common words.

If you are looking for a good spelling checker that is quick and easily expanded to suit your needs then Regent Spell is the one for you. For $49.95 you can be assured that your document is without those dreadful spelling errors forever. Regent Software, 7131 Owensmouth, Suite 45A, Canago Park, CA 91303; (818) 883-0951. ●



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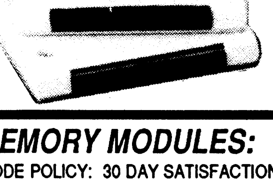
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